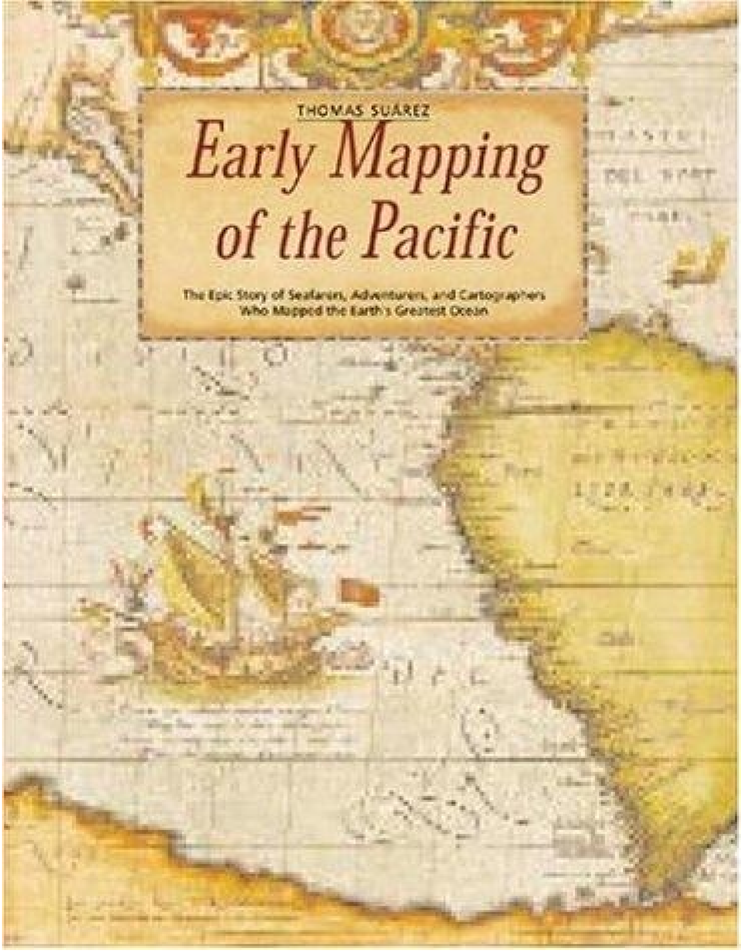
THOMAS SUÁREZ

Early Mapping of the Pacific

The Epic Story of Seafarers, Adventurers, and Cartographers
Who Mapped the Earth's Greatest Ocean



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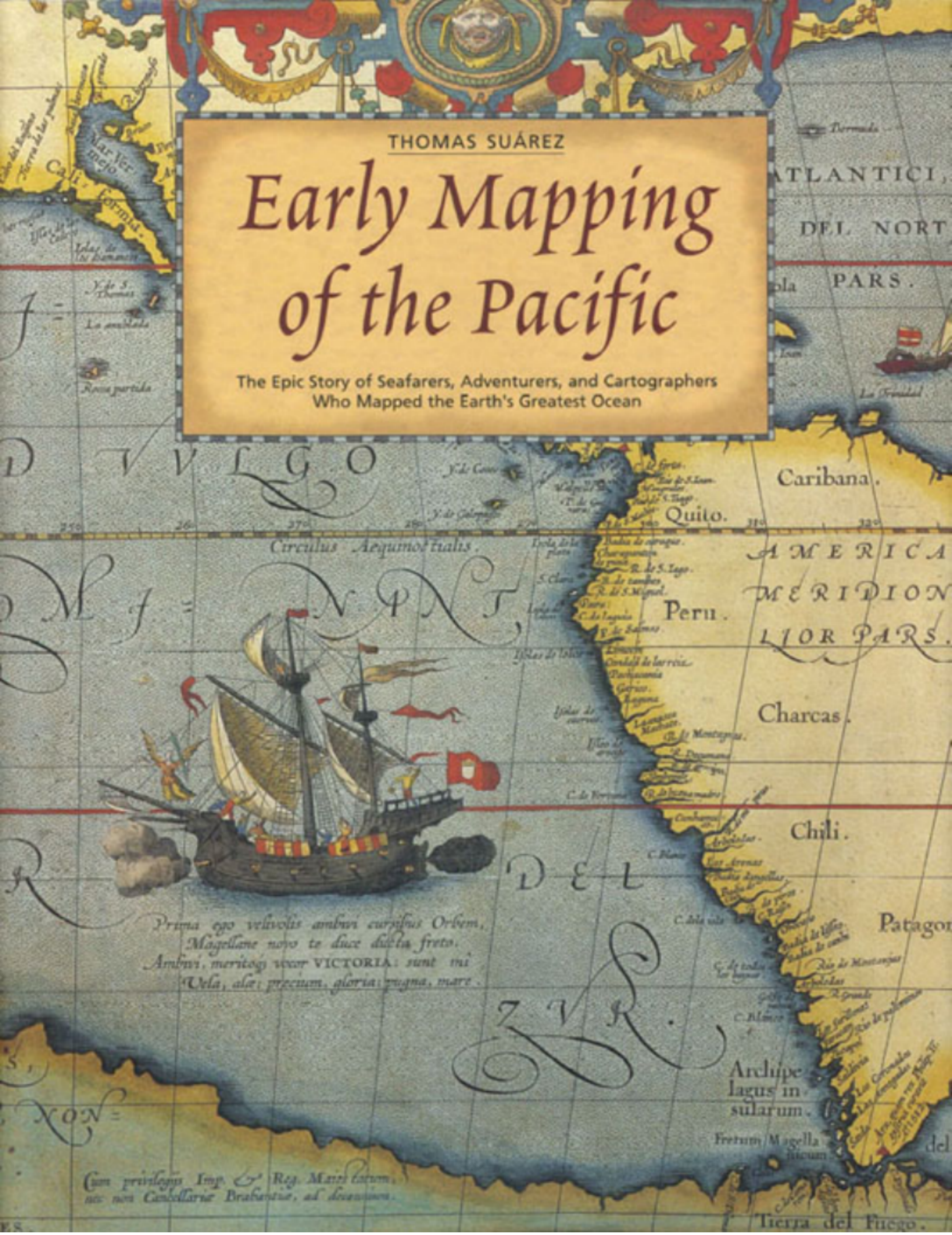

ATLANTICI,
DEL NORT
PARS.
Caribana.
Quito.
Circulus Aequinoctialis.
AMERICA
MERIDION
LIOR PARS.
Peru.
Charcas.
Chili.
Patagon
Prima ego velivolis ambivi cursibus Orbem,
Magellane novo te duce ducta freto.
Ambivi, meritoq. vocor VICTORIA: sunt mi
Vela, alæ; precium, gloria; pugna, mare.
Archipelagus insularum.
Fretum Magellanicum
Tierra del Fuego.
Cum privilegiis Imp. & Reg. Maits statum,
nec non Cancellariæ Brabantiæ, ad decennium.

THOMAS SUÁREZ

Early Mapping of the Pacific

The Epic Story of Seafarers, Adventurers, and Cartographers
Who Mapped the Earth's Greatest Ocean

US$50

The mapping and exploration of the Pacific Ocean, from Classical times through the nineteenth century, is deftly described in this book, complemented by over 200 images of early maps and prints.

No maps were left by the ancient seafarers who sailed east from Asia and were the ocean's true discoverers. Their cartographic thought and navigational genius, however, can be glimpsed through their accomplishments, and from the information their descendants passed to visitors. Medieval European, Asian, and Arab mariners mapped the islands in the westernmost Pacific, but the varied worlds of Oceania were unknown to all but their inhabitants until modern times.

Once Europeans began traversing the Pacific in the sixteenth century, the inability to accurately determine longitude became the bane of pilots and mapmakers alike. Islands were misidentified, confused with others, and "lost." The seventeenth century brought the Dutch exploration and mapping of Australia, while the major Polynesia archipelagos remained unknown until the latter eighteenth century. Not until the 1800s were detailed surveys conducted of major Pacific islands.

Front cover: Pacific Ocean (detail), Abraham Ortelius, 1589 (Fig. 49).
Back Cover: Chart of the North Pacific (detail), João Teixeira Albernaz I, 1630 [Library of Congress] (Fig. 51).

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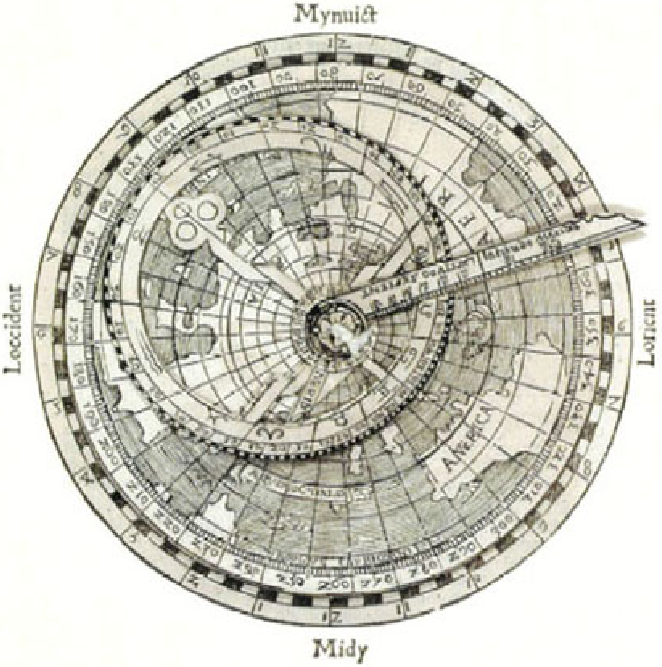
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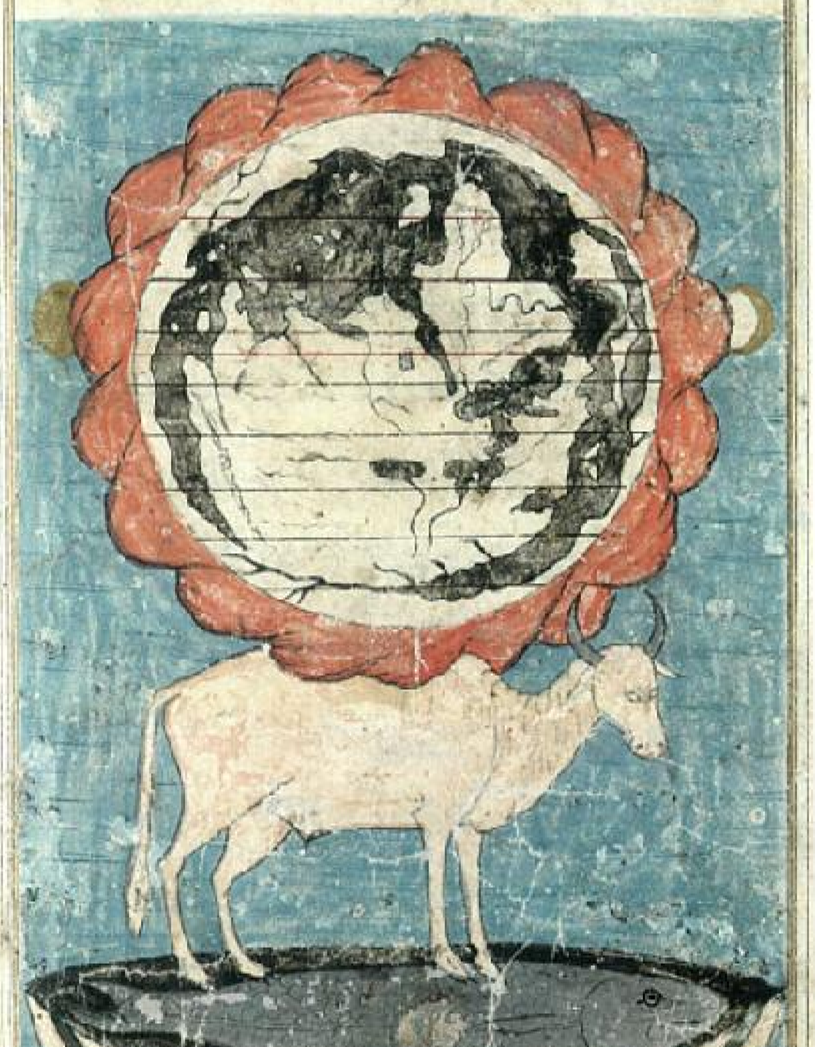

Early Mapping of the Pacific

The Epic Story of Seafarers, Adventurers, and Cartographers Who Mapped the Earth's Greatest Ocean

THOMAS SUÁREZ

PERIPLUS

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MAR DO SVL
AMERICA
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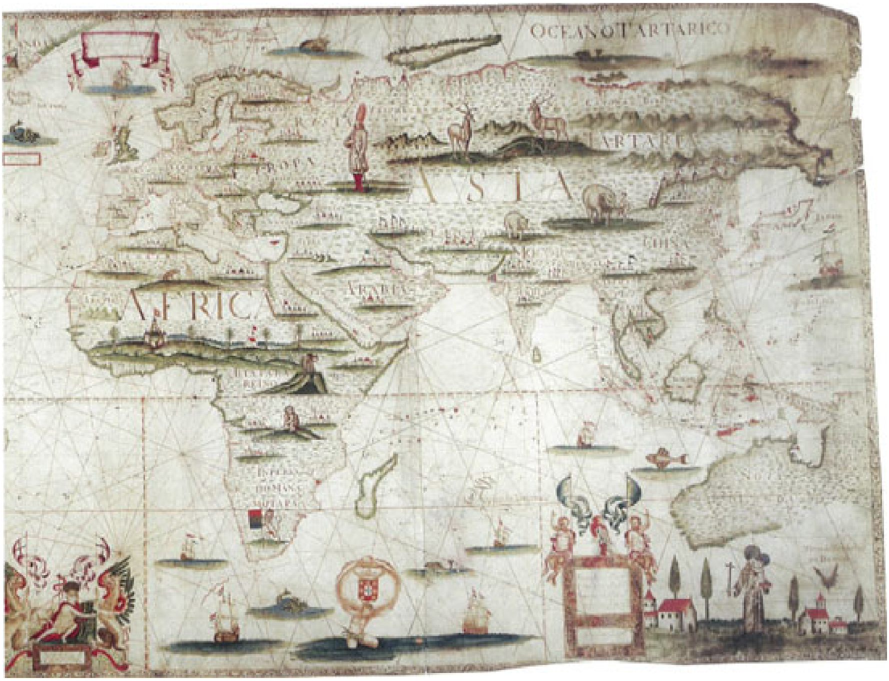
Front endpaper. Fig. 1. World map, Frederic de Wit, 1660 (ca. 1700). [Maryayan Lan, NY] *Page 1*: Fig. 2. Volvelle on a north polar projection, Peter Apianus, 1524, based on the Waldseemiiller pattern of 1507 (Fig. 28). Apianus's use of a north polar projection allows the Pacific to be mapped unbroken. The landmass labeled "America" is South America; the island above left is Central and North America. The Pacific's only inhabitants are Japan, based on Marco Polo (just left of North America, at 270°), and a simple representation of Southeast Asian islands. Page 2: Fig. 3. Islamic World Map, Zekeriya Kazvinî, *Acaib-ül Mahlûkat* (The Wonders of Creation), Istanbul, ca. 1553. An unusual depiction of the earths seas contained by the encircling mountains of Qaf, the whole resting, via land and sea creatures, in the firmament on an "ocean" in a cosmic vessel. [Library of Congress] Back endpaper: Fig. 223. Physical map of the Pacific by Philippe Buache, 1744 (1754), illustrating his theories about the "grand chain of mountains that traverses eastern Asia and western America." An "inhabited island" lies at virtually the exact position of Hawaii, about 40° west of Baja California and 19° north latitude. Quirós's Marquesas are based on a similar source as later used by Dalrymple (Fig. 130), and Roggeveen's Easter Island (*Isle de Páques*) lies near Davis's land, which Roggeveen had been searching for when he discovered it. [Antipodean Books].



Above: Fig. 4. World map, Jose da Costa Miranda, 1706. [The Mitchell Library, Library of New South Wales, Sydney] Overleaf. Fig. 5. Pacific Ocean, Levasseur, 1838. Pages 8 and 9: Fig. 6. Japan wedged between California and China, with Pacific islands discovered by Bernardo de la Torre in 1543 on the east, and the Liu-ch'iu islands ending at Taiwan (fermosa) on the west (detail), Abraham Ortelius, 1570; Fig. 7. Depiction of the Portuguese in the Indian Ocean, from Linschoten's Itinerario, 1596; Fig. 8. Southeasternmost section of the "Catalan Atlas," a world map attributed to Abraham Cresques, ca. 1375. [From a facsimile in the Library of Congress]; Fig. 9. Polynesian girl, drawing by Alfred Agate of the US Exploring Expedition, ca. 1840. [Naval Historical Foundation] for my parents, to whom I owe everything

Acknowledgments

My thanks to Rodrigue Levesque for saving me from would-be errors in my coverage of Micronesia; Frank Manasek for guiding me on scientific matters; David and Cathy Lilburne of Antipodean Books for opening their reference library to me; Jared Manasek for translating the old German relating to Fig. 135; Alfonso Suarez for translating the old Spanish in the Mendoza y Gonzalez book from which Fig. 100 derives; also David Woodward, Ben Finney, Giinter Schilder, and John Suarez.

Several of the finest dealers in early maps generously allowed me to reproduce items from their collections, and they are acknowledged with the images. Three of these stand out in terms of the sheer greed with which I imposed on them: Robert Augustyn, early map specialist at Martayan Lan Rare Maps and Books, New York; Alan and Charlene Walker of Lahaina Printsellers, Maui; and Paul and Mona Nicholas of Kauai Fine Arts.

The reproduction of maps in institutions would not have been possible without the assistance of specific individuals. At the Library of Congress, Washington, DC, I would like to thank first and foremost the remarkable James Flatness of the Map Division, whose expertise is rivaled only by his generosity; also Tracy Arcaro, Gerald Wager, and David Robinson of the Rare Book Division, and Jeffrey Flannery of the Manuscript Division. My gratitude also to Dr Cornelia Topelmann, Universitatsbibliothek Miinchen; Eliane Perez, Biblioteca Nacional (Rio de Janeiro); Christine Campbell, The British Library; Marijke Bessels, Koninklijke Bibliotheek (The Hague); Barbara Dunn, Hawaiian Historical Society; Janea Milburn, Naval Historical Foundation; Margot Riley, The Mitchell Library, Library of New South Wales, Sydney; Ellen R. Cordes, Beinecke Rare Book and Manuscript Library, Yale University, and Louis A. Hieb, University of Washington Libraries.

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my nature.

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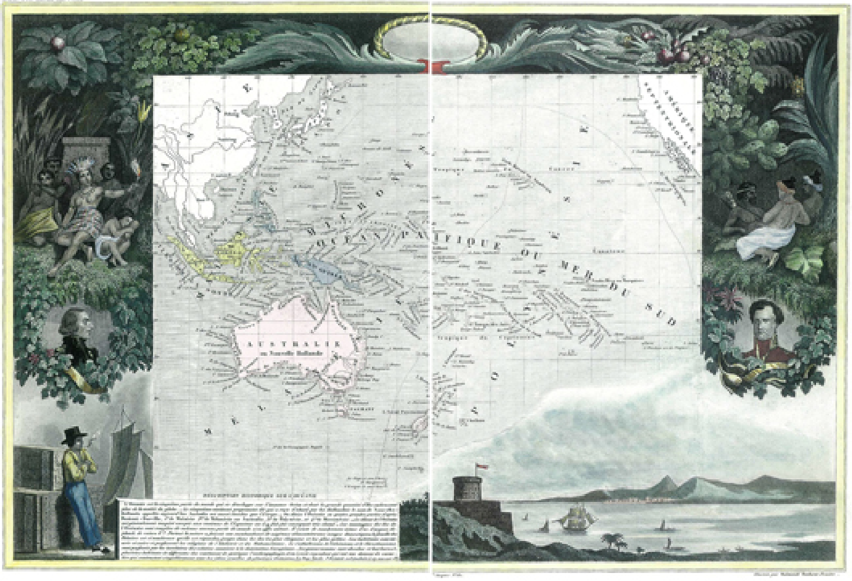
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OCÉAN PACIFIQUE OU MER DU SUD
MICRONÉSIE
MALAISIE
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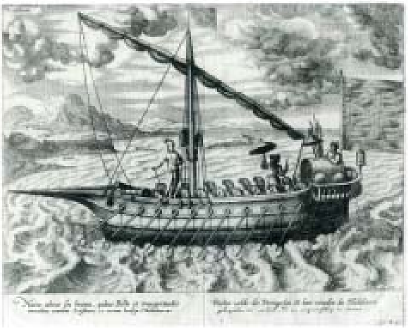
AMÉRIQUE SEPTENTRIONALE
Tropique du Capricorne
DESCRIPTION HISTORIQUE DE L'OCÉANIE



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220. World map, Japanese, ca. 1850.
221. Pacific map on a shipping crate label, 1917.
222. Drawing of Polynesian man, Alfred Agate, ca. 1840.
223. Pacific Ocean, Philippe Buache, 1744 (1754).

Introduction

Imagine thousands of self-sufficient nations, terrestrial microcosms linked not by valleys and rivers, not by deserts or forests, but by seemingly endless, featureless ocean. To the Pacific Islanders, this was the world. Around it, they evolved their civilizations and geographic methods. To Europeans, this ocean was the far side of the earth. An ocean that in maximum breadth spans virtually half the earth's circumference, it baffled mapmakers for four and a half centuries before its surface was laid down with confidence. In its scale, diversity, extremes of climate, and lack of points of reference, the challenges it presented the explorer and mapmaker dwarfed those of any other entity on earth.

For most of medieval humanity, the world consisted of dry earth of uncertain extent, bordered by sea. The earth was defined primarily by its land, and even people of archipelagos could relate their island to a core continent. Many people of the Aegean Islands, for example, may never have set foot on the mainland, but they could understand their island's position in relation to neighboring isles and, in turn, to Greece or Asia Minor.

But for the people of Oceania, the world was eternal sea; dry earth was the precious exception. Pacific Islanders typically knew that their land was limited in extent, even if they themselves had not seen its frontiers. Just to know that a village fisherman would be away for five nights and circumnavigate the known land, created a wholly different cosmographic perspective from someone who knew that even sailors who had been away for years returned knowing nothing of the dry earth's full circuit if, in fact, it had bounds. Amplifying this difference, until the fifteenth century European sailors rarely ventured very far from sight of shore.

Pacific Islanders mapping the world beyond their island would face two choices: below them lay sea devoid of any landmarks to record their way or gauge distance, while above them lay a sky which was rich in features and landmarks but was ever moving. The collective experience of many generations revealed subtle "cartographic" signs in the sea that European *eyes* missed and that guided them where maps failed. Generations of eyes peering upward garnered similarly hard-won secrets from the moving stars. Mapping the Pacific was as much a study of the sky as the earth.

Itineraries or travel directions, among the most prevalent and useful forms of early "maps," were similarly odd in the Pacific. A pilgrim traveling from to Dakar to Timbuktu, from Istanbul to Mecca, from Seville to Jerusalem, could follow fixed features, both natural and man-made. One could with reasonable confidence travel for days and months to a place he or she had never visited by following geographic directions, tracing one's way past features recorded by previous travelers. A misstep would not in itself result in likely death. Until the discovery of America, virtually anywhere in the known world could be reached by land. Marco Polo, for example, traveled from Venice to China?a distance far less than the breadth of the Pacific?by following points of reference. No such cartographic "markers" facilitated early travel in the Pacific.

The Pacific was also an important element of the geographic thought of the eastern Asian peoples. Unlike Europeans, in China and Southeast Asia the earth was generally believed to be flat, and thus the ocean sea was especially ambiguous? it did not necessarily "end" somewhere on continental shores. Chinese cosmography typically depicted the plane of the earth to be tilted, inclined to the mountainous northwest of China and leaning "down" to the Pacific in the southeast. The Pacific was thus where the earth's water accumulated, and for the various peoples of eastern Asia it was, according to the sixteenth-century European explorer Mendes Pinto, "the outer edge of the world."

The mapping of the Pacific was the work of many peoples, approached from different perspectives. Pacific Islanders offered pieces of the puzzle?the shape of an individual island, the relative positions of a group of neighboring islands, the nature of an interior region, undersea formations, or the location of fishing grounds. Asian pilots were familiar with many islands in the westernmost Pacific. Europeans tied together the sundry pieces to make a coherent whole, supplementing their own data with whatever they could glean from those who lived there.

This sharing of knowledge was not always easy. Islanders' maps were, with rare exception, ephemeral, typically shells or stones set upon the ground. They generally quantified distance by travel time, relating the number of days' sailing around and between islands. Islanders' knowledge of the heavens was of little value to European navigational techniques, and the Europeans' knowledge of mapmaking was of no use to the islanders until they adopted Western navigational equipment and theory.

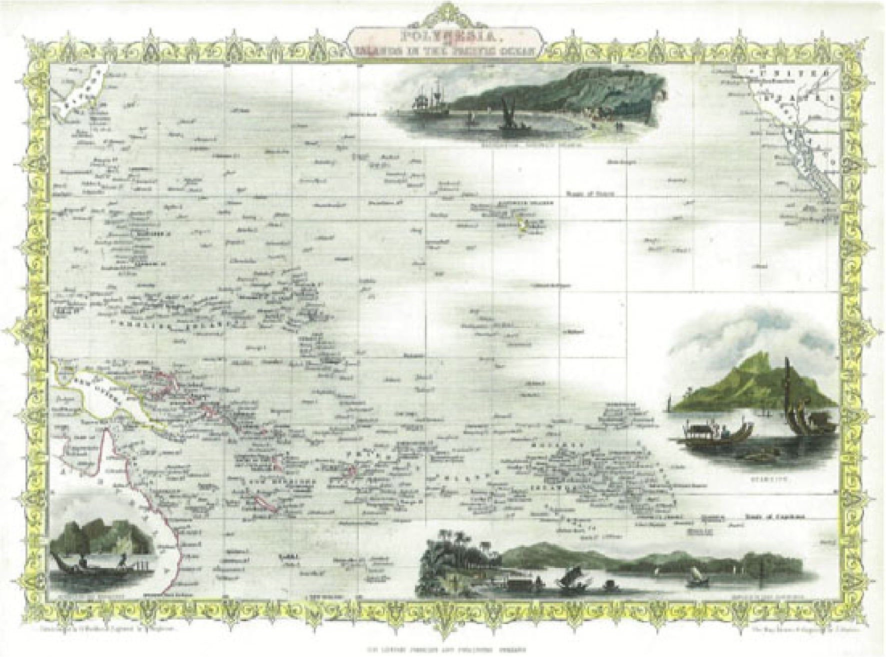


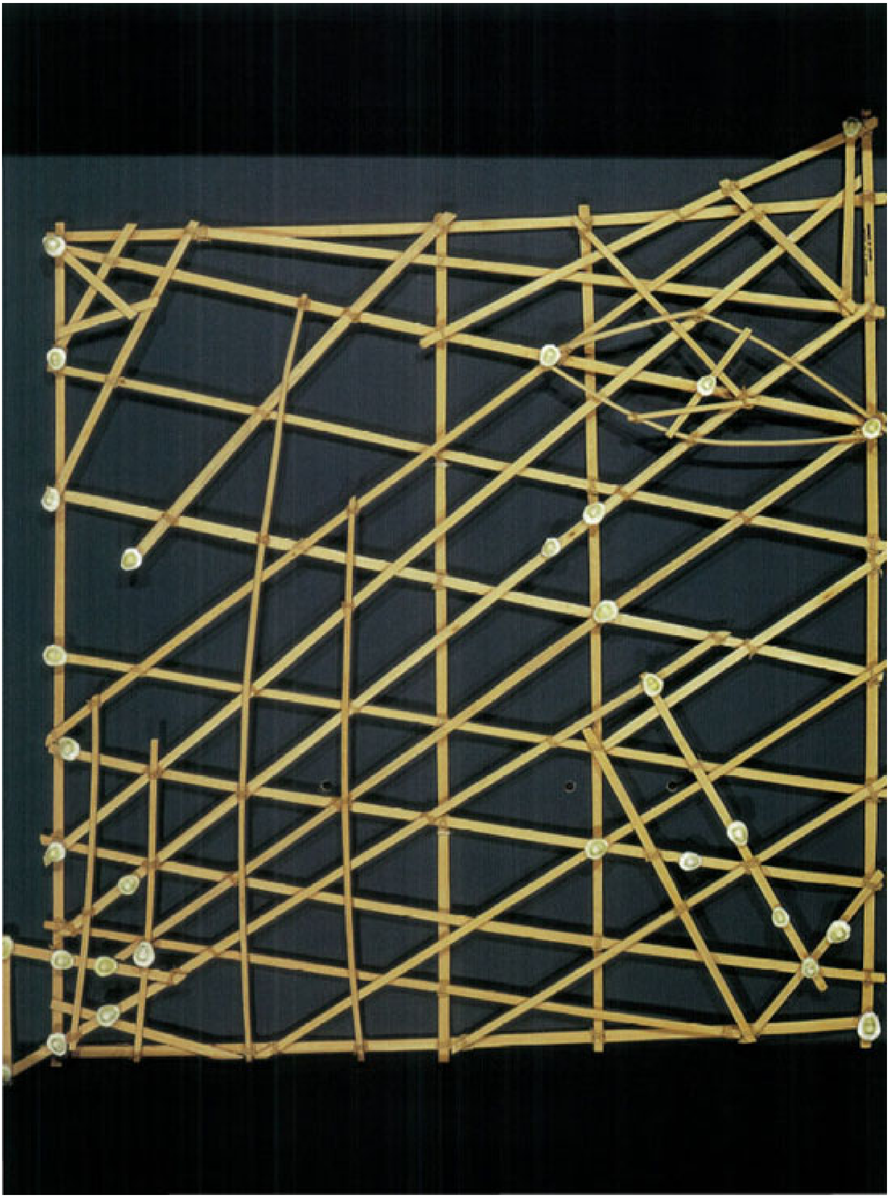
Fig. 10. The Pacific, John Tallis, ca. 1851.

What did it mean to "map" the Pacific? For Europeans, until the nineteenth century it was primarily determining the ocean's perimeter and placing its islands in context, and only secondarily the mapping of the islands themselves. Mapping the features beneath the sea was always important when they reached within contact of a ship bottom, but the ocean floor was not seriously tackled until the late nineteenth century, and not mapped with any precision until the latter part of the twentieth century.

By the end of the seventeenth century, non-geographic and non-topographic Pacific data were also analyzed and set to maps. Latitudes at which specific winds blow, and magnetic declination, were among the earlier non-geographic data of interest to European mapmakers. The locations and habits of various Pacific fish and mammal species were laid to charts by the mid-nineteenth century, and the mapping of more esoteric data followed, such as the water temperatures at various depths and the cyclical changes in those temperatures, as well as the presence of exploitable resources on the ocean bottom.

This book attempts to give a general overview of the evolution of cartographic knowledge of the Pacific. The story is largely that of Europeans, who aggressively explored the Pacific and were singularly enamored of the mass-production and dissemination of maps. Ideally, the cartography of Pacific Islanders would be our starting point, but since these pioneers rarely left any tangible record, much of their story is elusive for the scope of this book. Asian and Arab pilots frequented the islands of the westernmost Pacific before Europeans, but much of what is known of their early western Pacific cartography must be gleaned from indirect sources.

Pilot books, trade records, herbal treatises, and even literature, have been tapped to construct a better idea of Asian geographic knowledge of the westernmost Pacific than the dearth of surviving early maps has allowed. The European mapping of the Pacific was at times a mapping of the European psyche: such icons of Christendom as Paradise, Ophir, the lost tribes of Israel, and Purgatory, all found their way to the Pacific at the hands of European authors and mapmakers. The Classical belief in an antipodal continent blossomed in the Pacific. Even the European self-examination of its own mores and values was mirrored in the Pacific, particularly in the latter part of the eighteenth century, when the ills that led to revolution in Europe found antidotes in perceived ideal Pacific Island civilizations. Refining the charts of Oceania began only in the latter eighteenth century, all the efforts of the preceding two and a half centuries yielding little more than a rare tiny speck placed with little confidence on a nearly empty canvas.



Chapter 1

The Pacific Islands and Their People

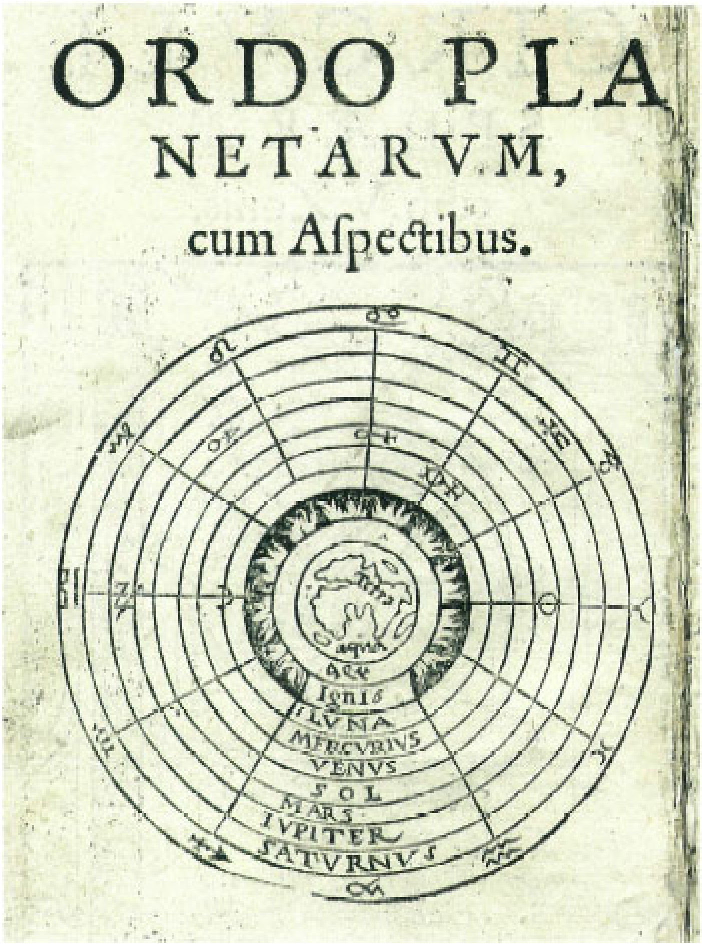
About 250 million years ago, the earth had one continent, the original single landmass of Pangaea, and one ocean—the Pacific. All of earth's other seas are subdivisions of the primordial Pacific, created when Pangaea split apart to form the continents we know today. This concept of the Pacific as the original ocean was not possible until the planet's continental outlines were known with accuracy, the jigsaw-like nature of their forms noted, and the concept of continental drift understood. In 1858, Antoine Snider observed that the continents all fitted neatly together like pieces of a puzzle. The implication of that observation—that the continents were originally one—was pursued by Alfred Wegemer, who championed the theory of continental drift in 1912. But no force was known that could move continents, which were thought to be permanently fixed in their positions on the earth. Three decades later, however, researchers began piecing together evidence that could explain the process of plate tectonics, which became widely accepted in the latter part of the twentieth century.

Even with its dramatic decrease in size since the time of Pangaea, the Pacific is still the largest entity on the earth's surface, greater than all the earth's land combined. The Pacific is the stage of the earth's most violent and active volcanoes (Krakatau in Indonesia, Kilauea in Hawaii), its deepest depression (Mariana Trench), its highest base-to-summit mountain (Mauna Kea in Hawaii), its most powerful storms and most placid calms.

Although the Pacific is the oldest ocean, it contains some of the earth's newest land, the progeny of its active geology. Several light oceanic plates comprise the Pacific: Nazca, running along the Pacific waters of South America; Cocos, along Central America; Juan de Fuca, off Oregon, Washington, and southern British Columbia; the Philippine; the Fiji; and the main, enormous Pacific plate, covering the remaining bulk of the ocean. These are surrounded by five heavy continental plates: those of North America, South America, Antarctica, India-Australia, and Eurasia. Volcanic activity occurs where these plates meet. Where plates drift apart, such activity may be frequent, but mild. Where plates are shoved against each other, volcanic activity can be violent.

Humans are relative newcomers to all but the southwestern Pacific islands and Australia. These were first settled when glaciers locked up such a staggering volume of water that the seas sat well below their current levels and exposed land bridges that are now submerged. Estimates of the first migrations range from about 25,000 to as far back as 50,000 years ago. The southwest Pacific then consisted of two principal features: a continent dubbed

Sahul comprising what are now New Guinea, Australia, Tasmania, and the higher sea floor connecting them; and a large extension of the Southeast Asian mainland comprising what are now the western Indonesian islands, as far east as Bali, and their higher sea floors.


ORDO PLANETARVM,
cum Aſpectibus.
Terra
aqua
Aer
Ignis
LVNA
MERCVRIVS
VENVS
SOL
MARS
IVPITER
SATVRNVS

Opposite: Fig 11: Marshallese stick chart. [Library of Congress] Above: Fig. 12. The geocentric universe, Honter, 1546, showing the dry earth a single terra, looking to modern eyes almost like Pangaea. The ocean sea which surrounds it is the first of the several surrounding spheres, the others being air, fire, and the planets.

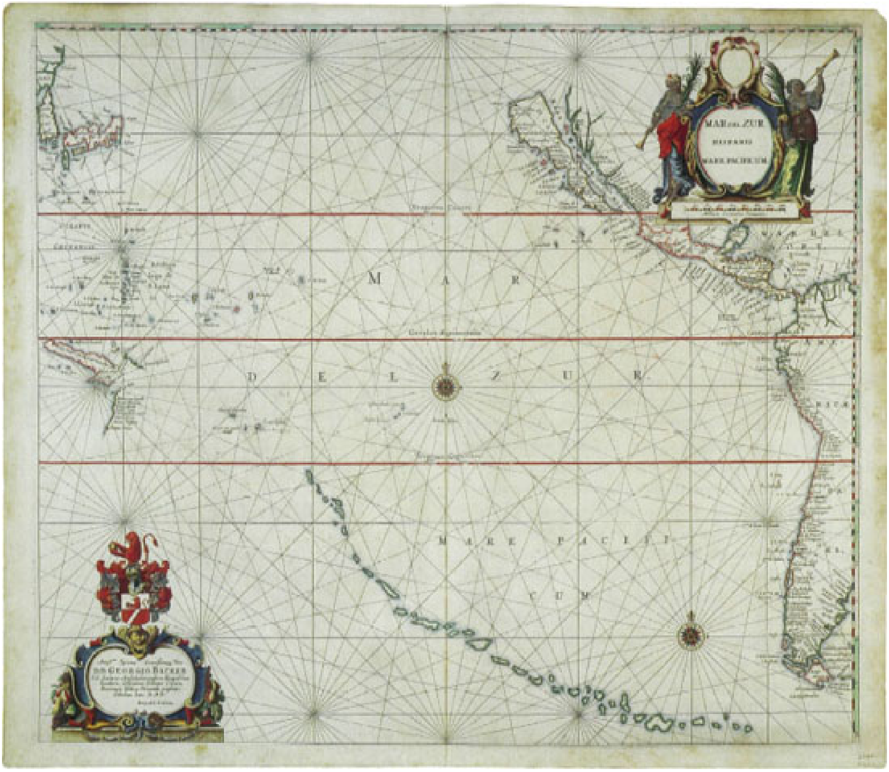


Fig. 13. Arnold Colom, ca. 1658. Found in the last (third) edition of Arnold Colom's Zee Atlas ofte Water-Wereldt. The chain of islands running along the southern Pacific was born from the coastline of the austral continent that occupied those seas in earlier maps, combined with the bafflement that "primitive" Pacific islanders could have reached their homelands without such closely knit islands connecting to continental shores. Colom's was the first published chart on the same scale as contemporary Portuguese and Spanish manuscript charts. [Martayan Lan, NY]

When the Ice Age ended, the ocean levels rose and the lower ground became ocean floor once again, submerging any record of the pioneers' coastal civilizations. The land bridges disappeared under higher seas, and the people who had ventured to Australia and Tasmania each evolved independently, cut off from contact with the rest of the world until modern times.

Human Settlers

Who were the first seafarers to venture further, into Oceania, and settle its islands? Many theories and nuances have evolved from the considerable research done into this enigma, but it is generally accepted that the Pacific Islanders came predominantly from Southeast Asia, the easternmost islands perhaps supplemented with a small number of Amerindians who sailed west from South America. There is no wide consensus as to exactly where in Southeast Asia the various waves of emigration originated, nor what was the impetus for abandoning their homelands for the uncertain expanses of the

Pacific.

The earliest wave probably began in the second millennium BC, originating somewhere in the Indonesian and Philippine islands, though any of the great river deltas of mainland Southeast Asia have also been proposed. Characteristic pottery called *Lapita* is found in the Bismarck Archipelago, just northeast of New Guinea, dated to about 1500 BC, and the peoples who created it soon settled as far as Fiji, Tonga, and Samoa. Anthropologists disagree on the rate of dispersal from this western edge of Polynesia. Some propose that no further migration east occurred for some centuries, Lapita culture waning as Polynesian culture developed, while others envision uninterrupted waves of settlers reaching further and further east until all the major islands were peopled. The easternmost corners of Oceania were settled relatively recently—the Cook, Society, and Marquesas Islands perhaps as early as 500-0 BC, and from them Hawaii somewhere between AD 200 and 850, and New Zealand between AD 800 and 1200.

Micronesia was probably settled in two principal waves. The first occurred about 1500 to 1000 BC, when people from the Philippines sailed east to the western Micronesian islands, including the Marianas, Palau, and possibly Yap. Eastern Micronesia was settled afterwards, perhaps about 1000 BC, by eastern Melanesians who went north and reached the Marshall and Kiribati islands. They, in turn, pushed westward, settling the intermediate islands of Micronesia, and eventually reaching the islands that had earlier been peopled from the Philippines.

Pacific seafarers, of course, did not know in advance what lay ahead in the open ocean. However, the coastal people of Austronesia inherited a collective subconscious of continuing islands to the east, and those who first were compelled to push further toward the rising sun probably assumed that more islands lay waiting for them. At first, the earth indeed must have seemed like a world of eternal islands. As one sailed east through the equatorial Asian archipelagos, the inventory of homelands must have appeared endless, with the thousands of Indonesian islands leading to New Guinea, and, in turn, to New Britain, the Solomon Islands, Vanuatu (New Hebrides), and New Caledonia.

But east of these archipelagos this predictability began to falter. The next steps in the push eastward, to Fiji, Tonga, and Samoa, involved a much wider expanse of ocean between islands. And pushing still further east, the scales vastly increased yet again. The initial landfalls in the Society Islands and Marquesas due east, and subsequently the Hawaiian chain far to the northeast and New Zealand on the south, involved extraordinarily long stretches of featureless sea dwarfing any heretofore faced by human wayfarers. Some vessels, however rare an occurrence, probably reached the western shores of America.

The European Record

Stars provided navigators with guidance to return to known islands, particularly within a narrow breadth of latitude. But the search for new islands would have been largely one of chance, no matter how cunning a navigator's ability to glean extremely subtle indications of land from patterns of waves, clouds, birds, fish, and ocean debris. Scattered, low-lying islands were especially difficult. Since the eye's perspective from the islanders' canoes was virtually sea level, atolls would have been invisible to the Pacific navigators until nearly upon them. It was already difficult from a European vessel: when, in 1817, Otto von Kotzebue left the eastern, Radak group of the Marshalls for the Aleutian Islands, he sailed through the western, Ralik chain without sighting any of its isles.

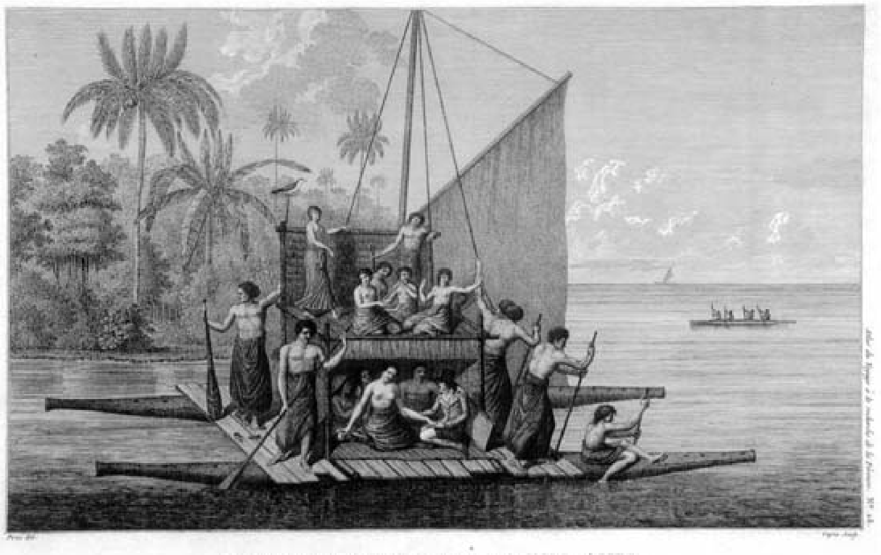
The European experience amply demonstrates the improbability of chancing upon land in the mid-Pacific. While mariners sailing the westernmost Pacific could hardly avoid encountering numerous islands, they routinely traversed the central and eastern regions without any significant sighting of land whatsoever. Captain after captain, though desperate to sight land where food, water, and sailors' health could be regained, sailed within a couple of hundred kilometers of lush, tropical islands without a clue. Tahiti, for example, lay invisible to European *eyes* until 1767; New Caledonia until 1774; and European nations plowed the Pacific for over two and a half centuries before they chanced upon the Hawaiian chain, despite their lust for discovery and despite their large vessels and their advanced navigational science.

When European explorers did encounter an inhabited Pacific island, some were so baffled to find that "primitive" people had reached such remote land that various explanations, other than the islanders' own industry, were offered. When, in 1595, people in the Marquesas told the Spanish explorer Quiros that they had gone by canoes to lands to the south inhabited by people of the same color of Quiros's black crew member, Quiros thought it nonsense, because he did not believe that they had vessels or expertise capable of ocean travel. Only a chain of islands loosely connecting archipelagos, he thought, could explain such an occurrence. Indeed, the enigma of people having settled remote Pacific islands likely helped sway some mapmakers to string such a chain of islands from New Guinea to the southeast (Fig. 13). The people of Easter Island, according to their European discoverer Roggeveen, "must either have been created there [or] brought by another means, and these thus preserved their race by procreation." The idea that navigation could have placed them there "at the time when Jerusalem nourished in full power under the rule of King Solomon and thereafter under the monarchy of the Romans and other peoples located in the Mediterranean Sea," he found so ludicrous "that wanting to maintain this would resemble mockery rather than serious thought."

James Cook became well aware that a common underlying language connected far-flung Polynesian peoples, and frequently expressed his bewilderment at the inescapable implications. Julien Crozet, who sailed around the southern Pacific at about the same time as Cook, theorized that the various Polynesian islands were vestiges of a great continent that sank in massive volcanic eruptions, leaving only its highest peaks above water; the Pacific Islanders had not traveled to their homelands, but rather been stranded on them. Similarly, Thomas Pennant wrote, in 1800, that "those who consult the map of this portion of the globe will instantly perceive the effect of the rapid discharge of the waters after the destruction of the old world by the deluge, aided by volcanic fury … we do not know the antecedent form, but it was evidently shattered by that great event." Quiros and Crozet's hypotheses were reasonable, and surely the idea that people lacking large ships and sophisticated equipment had traversed such expanse of ocean must have seemed a radical proposal in contrast. The mystery "hath already exercised the abilities of the ingenious," Henry Wilson, shipwrecked in Palau in the latter eighteenth century, summarized.

Pacific Settlement: Deliberate or Accidental?

What motivated Pacific Islanders, relying only on their skill and courage, to sail in small craft into the unknown expanses of the seas? Scholars have generally pursued two theories, one that the Pacific Islanders' migrations were the result of mishap, the other that they were the fruit of purposeful, planned exploration. Both theories are surely correct.



DOUBLE PIROGUE DES ILES DES AMIS.

Fig. 14. A double canoe of Tonga as seen by the d'Entrecasteaux expedition in 1793 and drawn by Nicolas Piron (Paris, 1800). [Antipodean Books, Maps and Prints]

The theory of accidental odysseys envisions Pacific seafarers being cast adrift from storm, faulty navigation, or overnight piloting forfeited by unexpected clouds. Winds and currents would commandeer the vessel until a chance encounter with a new island, or until reaching within sufficient proximity that a savvy pilot could discern signs in the seas indicating that it lay nearby.

Such an encounter would have been highly dependent upon the quirks of the particular storm, as scholars have demonstrated that the prevailing winds and ocean currents would not escort a craft from the more westerly islands to the archipelagos of the central Pacific. Further, people cast adrift while on a routine excursion would doubtfully have taken with them sufficient supplies to survive many days' wanderings. The instance in which a lost vessel reached a new inhabitable island with its passengers alive must have been rare indeed, one lucky canoe for the many lost to the anonymity of the Pacific floor.

In the Duff Island of Taumako (Melanesia) in 1605, Quiros learned from an islander of what may have been an unplanned Polynesian migration. The man, himself not native to Taumako, explained that fair-skinned (that is, Polynesian) people from "Guaytopo" had set out for an island called Mecayeayla but that contrary winds blew them far away, ultimately putting them ashore at Taumako. The women wore a translucent blue-black garment which they called a *foa foa,* apparently a garment made from tapa. Another Guaytopo vessel with two hulls (a double canoe) had reached Chicayana with fully 110 people. In both instances, the Melanesian man, whom the Spaniards called Pedro, was struck by their exoticism, unfamiliar canoes, and the fair, handsome girls with strange clothing, these differences all suggesting the arrival of people from some distance.

The plight of one lost Tuamotu fleet is documented in 1821. Three vessels with 150 people left the atoll of Anaa to greet the new king in Tahiti. The Anaa-Tahiti shuttle appears to have been a relatively common voyage, the navigator lining up his canoe on the sand straight for Matavia Point on Tahiti. Launching the craft at sunset with *eyes* fixed on the first bright star on the western horizon, a succession of stars would appear throughout the night, a living chart to illuminate the course to those privy to its hard-won secrets.

Two days into the voyage, a gale separated the fleet and drove it back. One vessel, a 30-foot double canoe, reclaimed its course but was then greeted by another storm which sent it far into windless seas, where it was becalmed for more than a week under the hot, rainless sky. The two weeks' provisions were soon exhausted, and of the 48 people on this vessel—23 men, 15 women, and 10 children—17 died. Eventually, rain and a catch of three sharks sustained them until sighting an uninhabited island, where for ten months they prepared to attempt the return voyage. This island was Vanavana, about 800 kilometers to the southeast of their home island of Anaa and roughly twice the distance they would have sailed to Tahiti. Their canoe was then damaged attempting to land at another island, resulting in another eight months' delay while the vessel was repaired and stockpiled with dried fish and pandanus cakes. Before they left, the British explorer Frederick William Beechey happened across the wayfarers, rescuing one of the canoe's families (his ship had no room for the rest) and getting word to Tahiti for a rescue of the others.

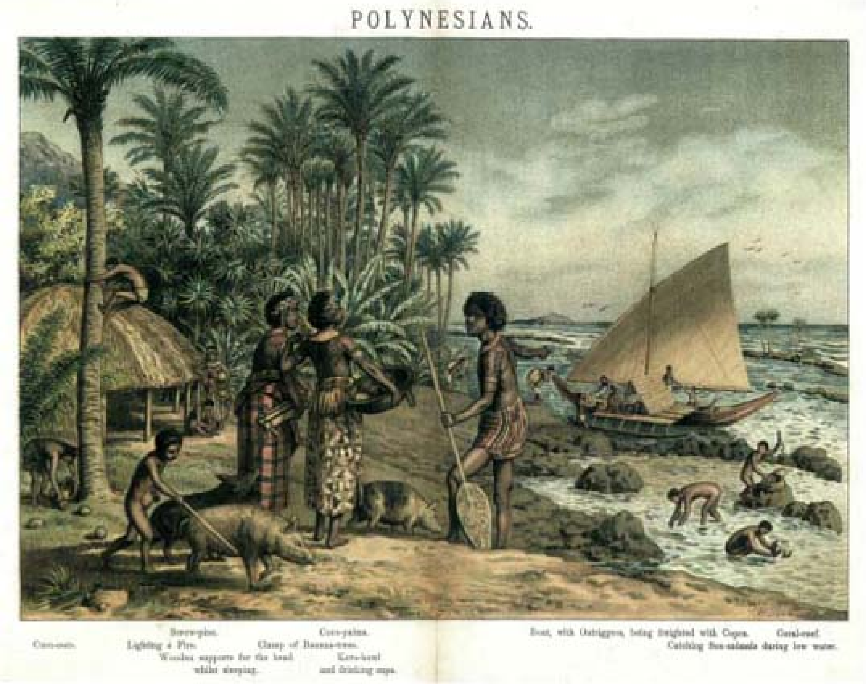

POLYNESIANS.
Screw-pine.
Coco-palms.
Coco-nuts.
Lighting a Fire.
Clump of Banana-trees.
Wooden supports for the head whilst sleeping.
Kava-bowl and drinking cups.
Boat, with Outriggers, being freighted with Copra.
Coral-reef.
Catching Sea-animals during low water.

Fig. 15. "Polynesians." A late nineteenth-century impression of daily life. Lithograph.

James Cook noted the likelihood of chance dispersal of people when visiting Tonga in 1777. He explained that the islanders rely on the position of the sun and stars to navigate, and solely on the direction of the winds and waves when those celestial guides are obscured; but if with overcast sky the winds and waves should shift, "they are then bewildered, frequently miss their intended port, and are never heard of more." However, the islanders' stories of their people being driven to other islands "leads us to infer, that those not heard of, are not always lost."

While lost seafarers reaching inhabited islands would need only the indulgence of the island's people, those reaching an uninhabited island would have had to be carrying a sufficient number Boat, with Outriggers, being freighted with Copra. Coral-reef. Catching Sea-animals daring low water.of people of both sexes. Moreover, the new land's indigenous commodities, along with whatever happened to be in the canoe, would have had to have been adequate to establish a new civilization. Indeed, despite our imagery of lush Pacific islands with a gentle environment and a seemingly limitless bounty of food, newcomers cast onto a typical uninhabited Pacific island, particularly the lower, smaller atolls, would have initially faced a vicious challenge for mere survival. Many of the plants and fauna we associate with such islands were imported by their early inhabitants, and to believe that the islands afforded their earliest human occupants an easy life would be to trivialize their accomplishments.

The theory of deliberate, planned migrations raises the question—why? Why would islanders have undertaken such difficult and dangerous displacements? Exploration for its own sake was not a likely motivation of Pacific Islanders. And there is no indication that religion, a paramount incentive in European exploration, had any role whatsoever in the voyages of Pacific Islanders, either for proselytizing or religious freedom. Nor does the quest for wealth (beyond a livable food supply) appear to have driven Pacific Islanders as it did Europeans.

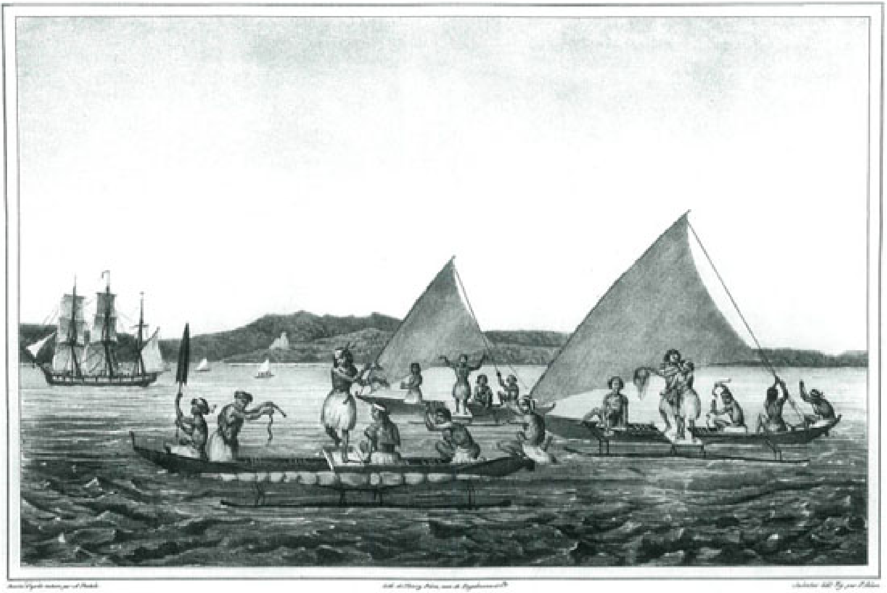


Fig. 16. View at Pohnpei, as seen by Frederic Lütke in 1828. Note the similarity of their mien with that of their descendants in Fig. 17. From Lütke's *Voyage,* 1836.

Rather, wars and overpopulation are the most likely motivations. Islanders were squeezed from their homelands by wars, whether internal or from new waves of immigrants, and from the population growing beyond what the islands' resources could sustain. In contrast to accidental voyages, deliberate colonizers likely planned a return voyage home to transport more people, plants, and livestock to seed their new colony with confidence.

Cosmology

Subsequent migrations eastward into islands already inhabited would have produced gradually lessening ripples of further migrations by newly displaced peoples. Immigrants assimilated into other islands' populations would add to natural population increase until the new island, in turn, could not support more people. Polynesian legend records various invaders from the west: Papua New Guineans invaded the Carolines, Tongans invaded the Society Islands, and there is a record of Marquesas Islanders fleeing seaward to escape an invading army, perceiving that their small chance of survival to a new home was greater than the chance of survival against the conquerors. When the Europeans arrived, they stepped into this kaleidoscope of deliberate and accidental migration.

Pacific peoples had no written languages; histories were passed orally. Regrettably, those histories were never preserved in writing very early into post-European contact. Within a matter of two or three decades, the effects of conquerors and missionaries corrupted those histories, irrevocably interrupting their transmission from one generation to the next.

One of the more intact of surviving Pacific oral histories comes from Pohnpei, a Caroline island, which was not the site of significant European presence until the nineteenth century. The account was left us by a Pohnpeian man named Luelen Bernart, who placed his birth year at 1866, about twenty years before the first missionaries arrived. In 1934, having been taught to write, he set to paper his island's history as he knew it. No island's oral tradition was monolithic; other Pohnpeians recited varying histories, and Luelen's story entwining Christian strands makes clear that his was not entirely "authentic." Nonetheless, the text comes as close as we have to a Pacific civilization's own history, revealing several independent migrations, some of which were deliberate and repeated.

It begins by relating how in olden times a man named Japkini, on the shores of a far-off land, made a canoe that was large and deep, that would be sufficient for many people to ride in. A woman named Lipalikini hewed out the hollow of the canoe, while another, Lijapikini, carved its designs and made the outrigger, and a third, Litorkini, made thread from the fiber of the outer layers of the trunk of banana trees, then wove a sail from the thread.

The Pohnpeians envisioned the sky as the eaves of a house (which on a Pohnpeian house extend quite close to the ground). If people went past the sky's "eaves," they would find that there was a new land there. Thus, Japkini gathered together the people who wanted to go forth with him to hunt for Kitoroilan Tapuaijo, the "eaves of Heaven," where the underside of heaven comes down nearly to touch the earth. The men and women who made the journey seemed symbolically to become the canoe itself, their names becoming the Pohnpeian names of the parts of the canoe.

Sailing forth, two women secured wind for their sails, whose brightness calmed the sea. The people humbly greeted an octopus they met in the ocean. "Who are you people in this canoe?" the octopus asked. "I am Japkini," the man replied, "who is looking about for land, and now I would like you to teach me things…. What is your name, and where do you live?" to which the octopus replied, "I am Litakika who lives on a submerged reef which extends from the West to the East." Traveling far, they discovered the reef of which the octopus had spoken. An exposed part of the reef with a bit of coral, but no vegetation, was named the Lagoon of Life, while the reef was named Above the Lagoon of Life.

Now we find another symbolic transition. Whereas earlier the canoe's parts had assumed the names of the travelers, now the canoe itself "spanned the bit of coral." The canoe, it seems, became the new homeland.

They built up the land, spread it out to make a level place, and called for Katinanik, the mangrove, to protect the land from the waves. Since the open sea was close to the edge of the land, they also called Katenenior, the barrier reef, to surround the land. Two women made a large platform of earth to which they gave the name of Pei (Stone Structure) and everything that was on top of this rock they called Pohnpei, "On the Stone Structure."

Now wanting to return to the land from which they had come, they put some soil in the canoe to sustain some plants that would provide food during the long voyage. A man and woman stayed behind, but their descendants were more ignorant, and they became naked, for they had nothing with which to make clothes.

A second voyage arrived. The captain and his wife helped scoop more earth onto the stone structure. But there were no houses, and for a long time they lived under rocks. When a third voyage came, the new people made houses, but without thatching for there was not yet much vegetation. A man who came on a fourth voyage propagated the ivory nut palm and provided thatch for the houses. Then the original canoe came back to bring the original woman home, but she no longer wanted to leave. People and land propagated, and the people made clothes out of leaves. But there were two kinds of people, humans and cannibals, the latter very cruel with no love in them. Although they multiplied in Pohnpei, the humans always got rid of them.

The land grew much larger and higher, and the inhabitants were better off, had more food, and used breadfruit bark to make clothes. More voyages came, each with its contributions.

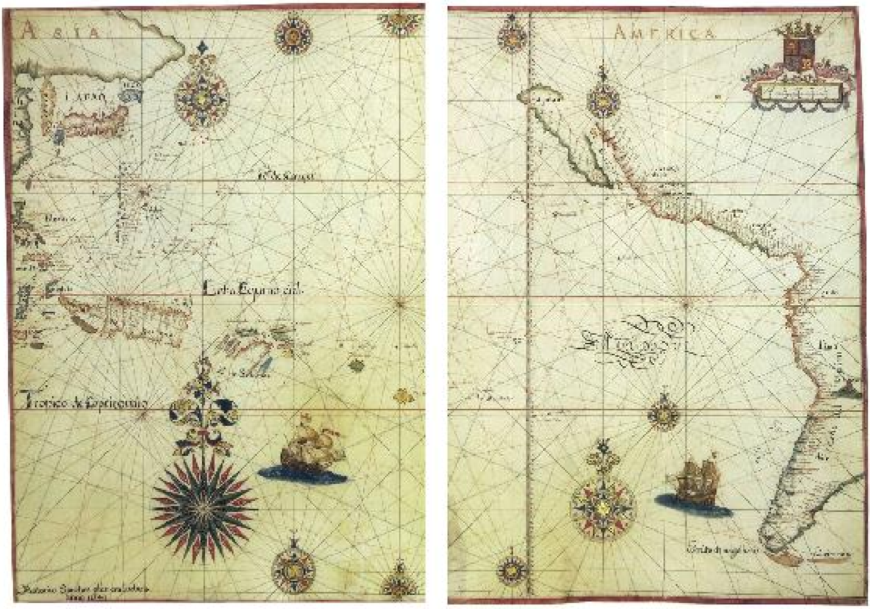
Indigenous Maps

Elements of this Micronesian cosmology were probably typical in Oceania. Polynesians, according to the missionary William Ellis, resident in Polynesia between 1817 and 1825, "imagined that the sea which surrounded their islands was a level plane, and that at the visible horizon, or some distance beyond it, the sky, or rai, joined the ocean, enclosing as with an arch, or hollow cone, the islands in the immediate vicinity." Ellis wrote that they imagined the European countries to have a distinct atmosphere, enclosed in the same manner as they thought the heavens surrounded their own islands. "Hence they spoke of foreigners as those who came from behind the sky." The islanders' traditions and songs, Ellis observed, recorded the names of other Polynesian archipelagos.

Fig. 17. Children on Pohnpei, Caroline Islands. [Photograph by Thomas Suarez, 1974] *Overleaf.* Fig. 18. Pacific Ocean, Antonio Sanches, from *Idrographisiae Nova Descriptio,* 1641. [The Hague, Koninklijke Bibliotheek]

Did Pacific Islanders use maps to assist them in their formidable voyages? Any discussion of indigenous Pacific cartography, indeed of any non-Western cartography, unavoidably leads to confronting the definition of "map." While the abstraction of geographic features and cosmographic concepts appears to be universally human, the common Western notions of a map, with its implicit sense of empirical geographic accuracy, were not. In the southwest Pacific, the historical record has left us little with which to reconstruct what its peoples' cartographic tradition might have been. There is no knowledge of pre-modern, non-cosmographic mapping from the Philippines, barely more than scant textual reference of it from the Indonesian islands, and none from the people of Australia, Tasmania, or New Guinea. This is not to suggest that they did not make geographic maps. Rather, theirs were ephemeral, for example of shells, stones, and leaves arranged upon the sand to replicate island or interior locations.

Knots tied in a cord as a pneumonic to follow and memorize geographic features was likely a common practice throughout Oceania. When George Robertson, sailing master on the maiden European encounter with Tahiti (1767), showed a Tahitian man around their vessel, he "observed every Joint in the Chairs and Tables, and measured the length and breadth of every Joint of our Chairs and the Gun-room table, and marked his measures on a piece of Line, which he brought with him." Robertson realized that the man was making different knots for length and breadth, and that this method would allow him to reconstruct the furniture. La Perouse had the same experience with the people of Easter Island (see page 169 below), and when a Palauan boy accompanied Captain Henry Wilson to England in late 1783, he was "extremely desirous of knowing the name and country of every ship he met at sea," and made a knot in a line to correspond to each country as he committed the new names to memory.



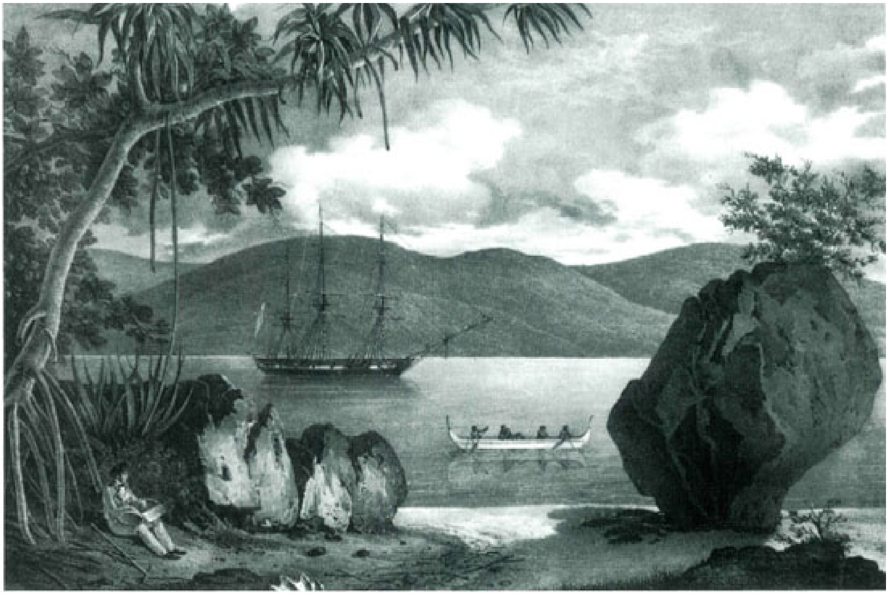


Fig. 19. View in New Ireland, Dumont d'Urville, 1830. [Donald A. Heald]

Various abstract representations and allegories were used by Melanesian peoples, and although these may justly be considered cosmographical maps, they do not fit into the scope of this book. Many cartographic compositions of Pacific people, such as drawings of huts in a village, of the sequence of a hunt, of the arrangement in a canoe, or the formation of people in a battalion, straddle the line between the cartographic and the pictorial. Others cross into the metaphysical, such as spacial concepts associated with genealogies, bones of animals arranged according to the direction from which each animal was slain, or gifts that illuminate social stratification and associations. Such metaphysical "mapping" took many forms. In Borneo, for example, pigs' livers were read for divination, and in some cases the lobes of the ventral side actually represented geographic regions or spirit worlds.

Cartographic metaphors are also known in the Pacific Islands. Among the ways the Caroline Islanders mapped their archipelago was in the rough diamond shape of a triggerfish, the head of the fish always representing east. This cartographic device, the "great triggerfish," is composed of one, two, or many such diamonds, one above the other, their points and intersections representing islands.

Imagery of "literal" cartographic abstraction is found in a myth recorded in the Caroline Islands, in which the world is seen from above, as if a natural "map." One morning on Pulap Atoll, Inosagur, the daughter of the chief and Spirit Sagur, was bathing in the lagoon in front of the canoe house when a rainbow appeared and became the spirit Anumwerici. To keep this spirit from devouring the people of Pulap, Inosagur prepared two coconut vessels, one with taro, the other with water, and presented them to Anumwerici. Although the hungry spirit balked at the meager offering, Inosagur immediately replenished the two vessels every time he consumed their contents. He ate and drank until entirely free from want. To thank the girl, the rainbow-spirit taught her navigation. He put her atop a small coconut tree and caused it to grow taller and taller until it pierced through the clouds. From this perch, Inosagur was now able to survey all the islands, reefs, shoals, and the creatures in the sea, as if beholding a "map" of the world. She carefully memorized the stars under which every feature lay, and then Anumwerici had the tree gently return to its original size and set Inosagur on the beach. Inosagur's new-found knowledge begot two schools of navigation. When she had her first son, she passed on the art of navigation directly to him. He, in turn, later taught the art to his younger brother.

Frederic Lütke, while in the Caroline Islands 1827-8, recorded seeing maps in the form of tattoos. Some islanders' "legs and chest are covered with long straight lines which at first look like striped stockings. They trace the outline of several small fish on their hands, each about an inch long. It is strange to note that these figures bear the names of various islands. Peseng [one of the islanders], on his left thigh, above the knee, had a certain number of these fish as well as hooks, which represented Lougounor and the neighboring island groups; in addition, each line on his legs and hands was identified with the name of an island, from Faounoupei as far as Pelly. Having accounted for all these islands, there were still a few lines left which he called Manila, Ouon [Guam], Saipan, etc.; and as there were still a few lines left, he named them, chuckling as he went, Ingres [England], Roussia, etc. Perhaps this practice had been introduced to more easily recall the islands of their archipelago. It is a type of geographic rosary … women tattoo themselves in a very tasteful manner in places covered by their *tol?* the word *tol,* coincidentally, being the name of an islet in the southwestern part of Chuuk, visible on the d'Urville map in Fig. 190.

Actual navigational tools are found with the "stick charts" of the Marshall Islanders (Fig. 11). These unique cartographic devices varied widely. Made for the benefit of their creator and his apprentices, no wide standardization evolved. They were not known to the West until the latter part of the nineteenth century.

Three general types of stick charts have been noted. One, called a *mattang,* is not geographic, but rather a device to illustrate the manner in which islands cause interference patterns on the swells of the sea. The ability to "read" these subtle artefacts of the sea, allowing navigators to "see" where islands lay when none were in sight, was especially important to the Marshallese because of their islands' extremely low elevation.

Another type of stick chart, the *rebhelih,* mapped the principal islands of one or both chains of the Marshalls, the Ratak and Ralik. The third type, the *meddo,* is of a larger scale, mapping one section of one of the chains. Both the *rebhelib* and *meddo* can include such information as wave patterns, the direction of ocean swells, and the distance from which an island can be seen from a canoe. Islands are symbolized by shells, or simply by the intersection of the wood strips (typically the midribs of coconut fronds) from which the chart was constructed.

Yet even these specialized aids were doubtfully taken aboard the vessel. The islanders' navigational "map," rather, was an intricate knowledge of the meaning to be gleaned from subtle signs in the seas and skies. Many generations' experience gelled into a masterful interpretation of patterns—wave patterns, swell patterns, cloud patterns, and star paths. Song could help memorize the names and sequence of islands. They knew how to interpret the flight of island-bound birds while ignoring the paths of migratory birds. They could focus on a sea's ripples and discern whether they had recently passed around an island. Even a phosphorescent hue seen under water, and the reflection of sand and lagoon water on the horizon, could have been meaningful to the Pacific navigator.

European explorers invariably drew from native sources for guiding them to new shores, and ultimately in their mapping of Pacific archipelagos. Early mapping of the Caroline Islands, for example, is heavily indebted to indigenous information, gleaned from islanders cast onto shores where Europeans had settled. Upon being asked about the geography of their homelands, the islanders typically arranged stones or shells on the ground, then related distances in sailing time rather than linear distance.

Travel time was the only measure that islanders could ascertain with certainty, and indeed the only gauge of distance that mattered to their lives. Invariably, islanders would tell the Europeans the number and names of their islands, their orientation in relation to each other, and the travel time between them and around them. Europeans found themselves converting travel time into miles.

Some Society Islanders with limited European contact drew maps in the European sense, at European request. The most famous is that made by the Tahitian navigator and priest from Raiatea, Tupaia, for James Cook in 1769 (Fig. 141). In Tonga on his third voyage, Cook learned the distance to Fiji in terms of the number of days it took theTongans to sail there. Hoping to better estimate the linear distance between the two islands, he made several trials with a Tongan sailor under moderate winds and calculated, based on theTongans' sailing day often to twelve hours, the approximate distance by which to multiply the Tongans' figures.

Whereas the Europeans correlated stars to a particular moment in time to determine position, the islanders observed a succession of stars, rising on one horizon and disappearing on the opposite, to ascertain the direction of their goal. The Europeans' use of the compass and other navigation equipment, combined with the vast distances they wished to travel, made the "fixed star" approach far better for them. The "moving star" methodology was well suited for the Pacific Islanders, who lacked the compass and generally sailed within a narrow latitudinal breadth.

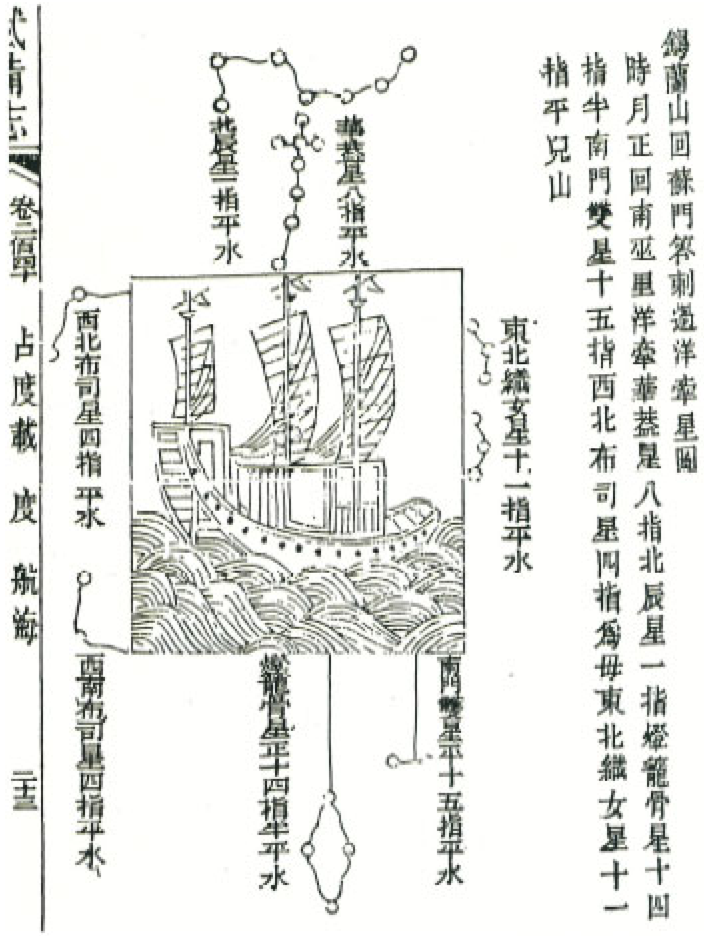
Pacific Regions

We can divide the Pacific into three major parts. Everything west of New Guinea, including Indonesia, the Philippines, Japan, and Taiwan, are considered the Asian-Pacific islands. To the south of New Guinea, Australia and Tasmania comprise their own distinct part. Everything from New Guinea and east is Oceania.

Oceania is, in turn, commonly divided into three. In 1756, Charles de Brosses coined the term "Polynesia" to denote all islands of Oceania, but that single blanket term soon became inadequate. Thus the explorer Dumont d'Urville, at a lecture at the Geographical Society in Paris in 1831, proposed using "Micronesia" for the many small islands sitting generally north of the equator in the central and western Pacific; "Melanesia" for the larger, generally volcanic islands whose people tend to be of dark complexion, and de Brosses's "Polynesia" for the remaining varied islands stretching as far as Easter Island and Hawaii. Like all simplifications, this system is flawed but useful. Although the terminology is inconsistent in that "Melanesia" technically refers to islanders' physical traits while "Micronesia" and "Polynesia" refer to the land itself, physical traits are closely associated with all three, Micronesians being generally smaller, like their islands, and Polynesians being well built and the most similar to Europeans.

Chapter 2

Mariners, Mapmakers, and the Great Ocean



錫蘭山回蘇門答剌過洋牽星圖
時月正回南巫里洋牽華蓋星八指北辰星一指燈籠骨星十四
指半南門雙星十五指西北布司星四指爲母東北織女星十一
指平兒山

Fig. 20. "Map of the guiding stars" for the voyage from Ceylon to Kuala Pasai in Sumatra, from the *Wubeizhi* by Mao Yuanji. Dated 1621 in the preface, the book was presented to the throne in 1628. Although Mao does not cite the source of the maps, there is little question that they are based predominantly on Zheng's voyages. "His maps," Mao states, "record carefully and correctly the distances of the road and the various countries and I have inserted them for the information of posterity and as a memento of [his] military achievements." In the Treatise, Mao explains that maps and information were collected before each voyage, and that "on repeated voyages, [one] compares and corrects the charts of compass bearings and guiding stars, and a copy of [the] drawing of the configuration of islands, water bodies, and the land." Some idea of Chinese contact with the westernmost Pacific islands is preserved in two texts, one written in 1178 by Chou Ch'ii-fei, an official of the maritime province of Kuang-hsi, the second in 1226 by Chao Jukua, Commissioner of Foreign Trade at Ch'iian-chou (coastal province of Fukien). The latter describes "the great Encircling Ocean" with such islands as

Sumatra, Java, and the Philippines, based on interviews with sailors. [Library of Congress]

Seafarers from the Pacific Rim were the true discovers of the Pacific, and in whatever manner and media were the first to map its seas and islands. Theirs was an ocean of indefinite boundaries, its geographic imagery gradually blurring with distance from their own island. For the more isolated peoples of the Pacific, such as the Easter Islanders, generations may have passed with only inherited memories of other shores.

Who were the first outsiders to follow in their paths, then return to tell their story and leave some cartographic record? When did the concept of the Pacific as an autonomous ocean, with an awareness of its defining perimeter, arise?

Theories have been touted of ancient trans-Pacific voyages by Asian or Classical navigators. While it is not inconceivable that such odysseys occurred, the theories proposing them rely heavily on selective evidence, supposition, and circular reasoning. Regardless of their truth or fancy, these purported voyages did sometimes affect the mapping of the Pacific. Particularly influential was a record from Classical Mediterranean civilization of such a voyage, which had a dramatic effect on the mapping of the Pacific at the hands of Renaissance geographers (see page 36 below).

Ancient Javan pilots were masters at sea, plying Indonesian waters and making round trips as far as Madagascar. Philippine sailors traded at least as far as western Malaya. Yet, although Chinese textual evidence records some sort of Javanese geographic map in the late thirteenth century, no early Javan map is extant, and no early Philippine map is known whatsoever.

No early Chinese maps extend further east than Chinas seas, and theories of early Chinese voyages across the Pacific—notably the oft-cited voyage of Hwui Shin to America in the late fifth century—have little substance. Not that they are impossible— evidence of Asian influence in Amerindian civilization, and the supposed discovery of Chinese artefacts in America, has been noted—but there is no evidence of a Chinese vessel having crossed the Pacific *and returned* to have had any influence on the Chinese world view, despite the retrospective influence in Fig. 21.

A Chinese navigator named Hsu Fu is said to have reached a P'eng-lai Island on a voyage of 219 BC—perhaps Japan, if the tale is not a myth—where he met with various magicians and officials. Back in China, he received permission from the emperor to return to P'eng-lai with colonists. He was never heard from again.

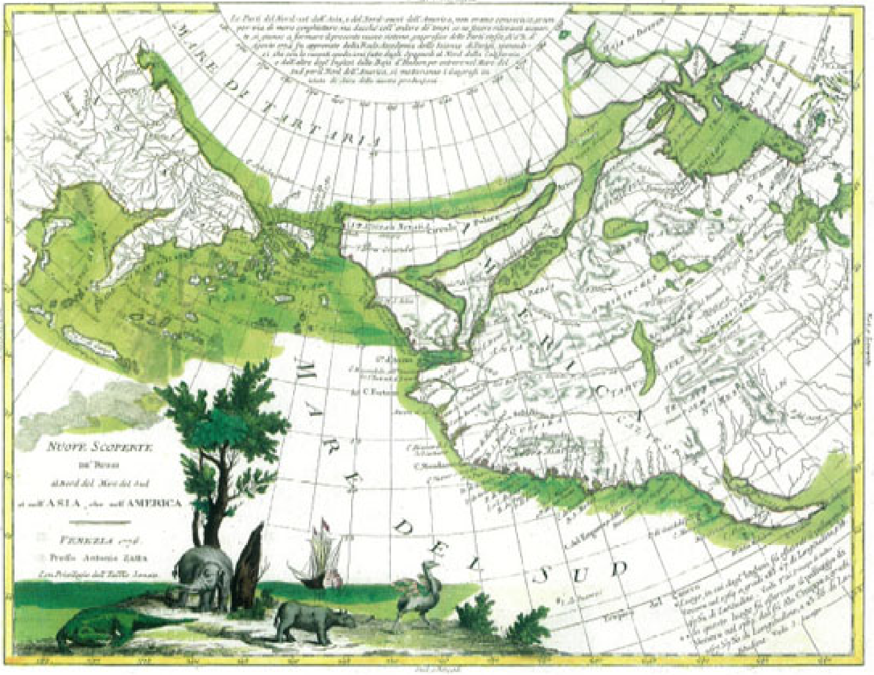


Fig. 21. The North Pacific, Antonio Zatta, 1776. Various misunderstood or mythical reports about the northern Pacific shores are combined, including the belief that Chinese mariners colonized America in the late fifth century. [Lahaina Printsellers, Ltd]

In AD 499, a Chinese historian named Li-yan-tcheou recorded the claim by a Buddhist priest, Hwui Shin, that he had sailed far to the east to Fu-sang, a country which has been dubiously equated with America, anywhere from Oregon to Mexico. Hwui Shin's journey purportedly took him first to Japan, thence northward to a place called Wen-shin, next eastward to Ta-han, and then a formidable voyage to the shores of Fu-sang. Fu-sang took its name from a plant that sprouts like bamboo, the fruit of which was said to resemble the pear, and the bark of which was made into cloth.

"Proof" of this early Chinese presence in the New World can be found on European maps more than a millennium later. Several eighteenth-century works record the ancient Chinese settlement which Zatta (Fig. 21) marks as Fou-Sang, "colony of the Chinese," in about the position of Vancouver, British Columbia. Such mappings of the ancient Chinese colony reflect the whims of data-hungry mapmakers and have no bearing on the historical question.

Similar claims have also been made about Zheng He (Cheng Ho), who commanded several voyages between 1405 and 1433, the only ambitious state-sponsored Chinese expeditions. But there is no substantive evidence to suggest that Zheng sailed further into the Pacific than the Philippines and Java. His adventures were focused on the Asian and African coasts of the Indian Ocean. Maps associated with Zheng He's adventures, the *Wubei zhi* charts, were printed in a work entitled *Wubei zhi* (Treatise on Military Preparations) completed by Mao Yuanji about 1621 (Fig. 20).

Chinese entrepreneurs were traditionally more adventurous than their officialdom, taking them into the western Pacific for centuries before Zheng He. The extant geographies, however, record nothing further east than Japan and insular Southeast Asia.

Japanese traders were active in Southeast Asian waters from about the fifteenth century, though the earliest surviving Japanese charts of foreign shores show Western influence. Early Thai geographic maps showing the western Pacific are also Western-influenced, their data having been assimilated from the substantial European presence in Ayutthaya which lasted until the expulsion of most foreigners in the Siamese Revolution of 1688.

Early Arabic seafarers were well acquainted with the China Sea, and by the tenth century had amassed geographic treatises and lexicons, pilot books, and herbal treatises that detailed geographic sources for medicinal ingredients. Arab navigators relied more on pilot books than charts. Many of the numerous Indonesian and Philippine islands catalogued in the pilot books cannot now be identified with certainty, and thus the eastern periphery of early Arab knowledge of the Pacific is unclear. That limit, however, doubtfully extended beyond the Moluccas or Banda Sea.

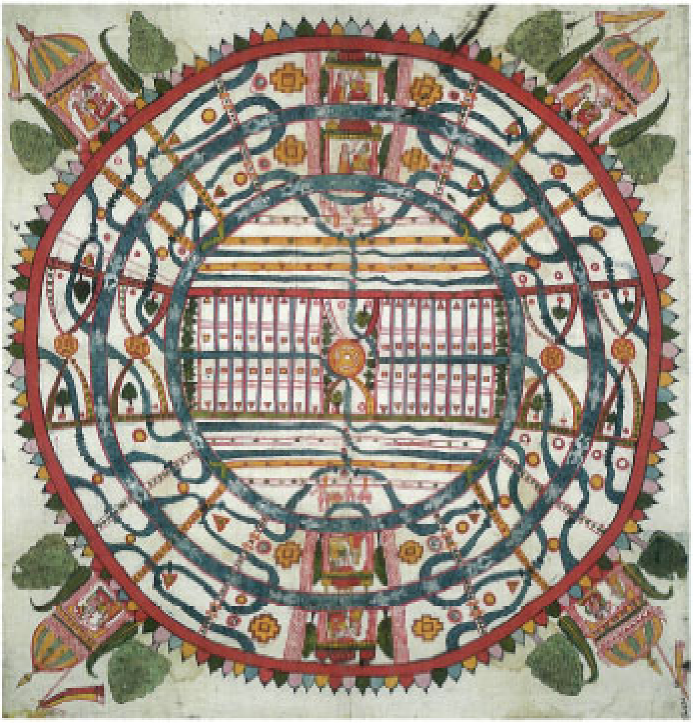


Fig. 22. *Manusyaloka* (The Human World), Western Rajasthan, late nineteenth century. Rather than a single encircling ocean sea, in this Jain world map the earth is surrounded by a

series of concentric oceans through which people and fish swim. Jainism, founded by Vardhamana Mahavira in the sixth century BC, developed geography and cosmography distinct from that of Hinduism or Buddhism. [Library of Congress]

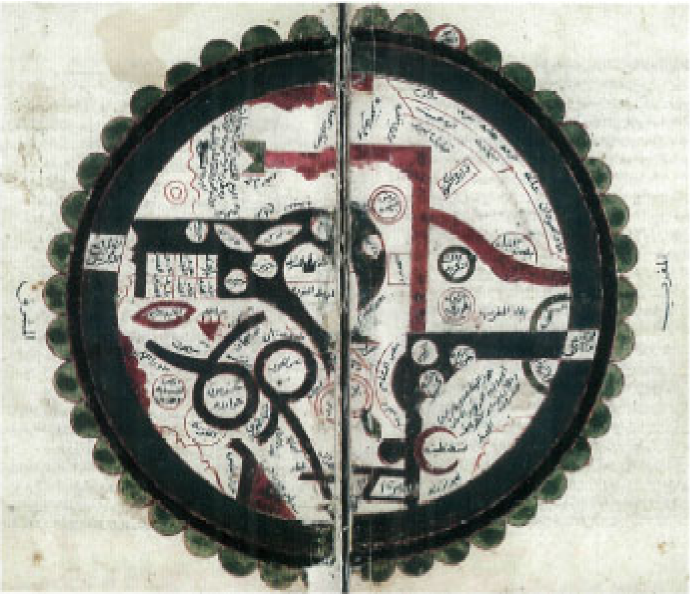


Fig. 23. Islamic map depicting the world surrounded by a wide, encircling ocean, with Mecca and Medina at the center. Umar bin Muzaffar Ibn al-Wardi, *Kharidat al-'Ajaib wa Faridat al-Gharaib* (The Pearl of Wonders and the Uniqueness of Things Strange), late seventeenth century. [Library of Congress]

Early Cartographic Traces

No early chart constructed from the empirical knowledge of Arab navigators is known. But a map used onboard in actual navigation stood only a tiny fraction of the odds of survival to our day as compared to its academic brethren, and only a small number of the latter have survived, most of them being later copies. Thus, this absence of Arab pilots' charts does not mean that none were made. The only extant early Arab maps to show the southwest Pacific are the work of academics sifting through a menagerie of data, much of it already archaic before reaching their desks.

The concept of an encircling "river ocean" was common in Classical geography, and medieval European *mappaemundi* often depicted an ocean sea surrounding the continental whole. Islands were frequently placed in this surrounding ocean sea, mostly based on medieval lore. The woodcut in Fig. 24 is a fragment of a fifteenth-century calendar showing the waters of the encircling river ocean and its islands. In the Turkish map in Fig. 3, we see the earth ringed by an encircling ocean, and also resting on the "ocean" of the firmament. Variations on this common theme are found in Jain cosmography (Fig. 22), which sometimes placed a series of oceans surrounding the earth, and Buddhist cosmography, in which the universe pivots around a central sea.

The Pacific was "mapped" conceptually by Ambrosius Theodosius Macrobius, a geographer, astronomer, and philosopher who flourished ca. AD 399-423, and whose ideas in turn were borrowed from Crates of Mallos, who lived in Asia Minor (Turkey) in the mid-second century BC (Fig. 71). Macrobius envisioned a spherical earth divided into four roughly equal quadrants, each with a continent. Europe, Asia, and Africa (which was envisioned as lying entirely north of the equator) comprised one of these continents. A second occupied the southern hemisphere of the same meridians; and the remaining two were likewise positioned in the northern and southern sections of the "other" side of the planet, what we would now call the Western Hemisphere. Although Macrobius, of course, knew nothing of the Americas, his concept formed a hypothetical, autonomous "Pacific" ocean belt. An aesthetic and philosophic construct, the planet's landmasses were balanced.

Another continent cited by Classical geographers which similarly partitioned the ocean into two, thus creating the "Pacific," was the continent of Atlantis, described by Plato ca. 400 BC. The discovery of America led some Renaissance geographers to revive the theory of Atlantis, identifying Columbus's shores with the lost continent. Sebastian Minister proposed this in earnest by way of a brief inscription in South America in his map of 1540 (Fig. 43), and some French geographers of the latter seventeenth century devoted maps of America to the theory that America and Atlantis were one and the same.

Long before Europeans ventured into the Pacific, it took on poetic significance through the pen of the Florentine poet Dante (1265-1321). Dante believed that antipodal to Jerusalem lay a mountain whose summit was Paradise, and whose lower section was Purgatory—this spot, unknown to Dante, lying in the south Pacific Ocean, south of Tahiti and the Marquesas. This dichotomy between Paradise and Purgatory gained new meaning unimaginable to Dante when, in the latter eighteenth and early nineteenth centuries, intellectuals and romanticists saw Polynesian society as a human paradise, the triumph of the Noble Savage over the hypocrisy and discontent of European civilization, while others condemned the same peoples as the incarnations of sin itself. "Antipodal to Jerusalem" would indeed become both Paradise and Purgatory.

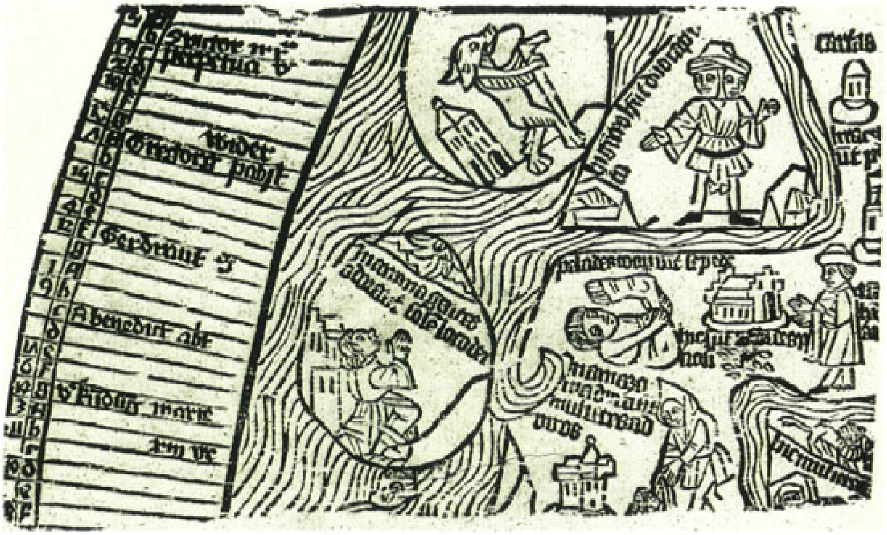


Fig. 24. A fragment of a calendar *mappamundi* probably dating from the fifteenth century, showing two islands in the encircling ocean sea and neighboring continental land. From medieval lore we see a man with a single large foot, and another with the head of a dog, both of which were commonly associated with the East.

The Discovery of America Defines the Pacific

The "Pacific" Ocean in its earliest sense comprised the waters between Asia and Europe, an idea implicit with a spherical earth. The concept of a spherical earth dates back to Classical times, and contrary to widely held myth did not disappear with the "Dark" and Middle Ages. Medieval *mappaemundi* depicted the westernmost Pacific with some Austronesian islands derived from Arabic data and from such European pioneers as Marco Polo, Friar Odoric, and, on fifteenth-century maps, Nicolo de' Conti. Their makers, if not always their audience, likely envisioned the earth as a sphere. But only globes would actually require a mapmaker to confront the full expanse of sea between Asia and Europe/Africa, and it is with a globe that we first see the ocean mapped as an autonomous body. Although globes were being constructed at least as early as the thirteenth century (their manufacture is described by Giovanni Campano ca. 1261-64), the earliest which is extant is that of Martin Behaim, 1492.

Behaim's conception of the waters between Europe/Africa and Asia was typical of late fifteenth-century geographic thought, placing a series of islands off the Asian coast, including Japan, the "Cathay" (China) islands, and various Southeast Asian isles. In the eastern part of the ocean he placed the Azores, Canaries, and Cape Verde Islands. The central "Pacific" is home to the mythical island of St. Brendan, the purported home of a seafaring Irish monk who according to legend roamed the seas in search of an Isle of the Blessed. A map believed to have been given by the Florentine cosmographer Paolo Toscanelli to Columbus would have been similar, and such was the ocean

Columbus thought he was crossing when he sailed from Spain in August of 1492.

Islands in similar location had, in fact, by Columbus's time already been placed empirically on the map. The Portuguese discovery of the Azores by the second quarter of the fifteenth century, if seemingly a modest prize in today's world, provided a foothold from which to launch new voyages in search of more islands and, so they thought, the Orient. That search, continued under the Spanish flag after Portugal diverted her resources to reaching the Orient via Africa, led to the discovery of America and thus the genesis of the "true" Pacific.

Overleaf. Fig. 25. The hybrid Caribbean/China Sea, a detail from the world map of Johann Ruysch, 1507. Unlike the Waldseemiiller map of the same year (Fig. 28), Ruysch envisioned South America as an autonomous landmass but North America as an easterly promontory of Asia, placing Columbus's islands in the China Sea. Frustrated that Japan and Hispaniola (*spagnola*) appeared to lie in exactly the same spot, Ruysch concludes that they are one and the same. He explains his dilemma in the inscription to the right of the island: "M Polo says that 1500 miles to the east of the port of Zaiton [China] there is a very large island named Sipagu [Japan] … but as the islands discovered by the Spaniards occupy this spot, we do not dare to locate it here … being of the opinion that what the Spaniards call Spagnola is really Sipagu." He notes that Polo's description of Japan matched the Spanish description of Hispaniola, "except for the idolatry" of its people. Cuba fell to even greater confusion. Since Columbus originally claimed that Cuba was continental, and since it lay even closer to the perceived Asian coast, Ruysch first mapped Cuba as a long peninsula jutting eastward ("down" because of the map's curved longitudes) from China. No example of the map in this state is extant, but it can be reconstructed from erasures in the engraved plate. Subsequent reports that Cuba was indeed an island led Ruysch to sever the peninsula from the main, leave only the easternmost tip, remove the "Cuba" label, and leave its western shores ambiguous. The ribbon substituting for its western coast, a mapmaker's "fig leaf" to conceal the unknown, simply states that the ships of Spain have reached this far.

HVC VSQ NAVES FERDINADI REGIS HISPANIE EVENERVT
TERRA NOVA
BACCALAVRA
C. DE PORTOGESI
ANTILIA
INSVLA
INSVLE DE AZORES
ISPAGNOLA
TERRA NOVA
SANCTE CRVCIS
GOLFO DE VERBICIDA
CAPO FORMOSO
ISTA INSVLA ANTILIA AL[?]QVAN[?]O A LVSITANIS INVENTA EST
SPAGNOLA
ENLANT
PERICVLO A DEMONIBVS
CANTALI
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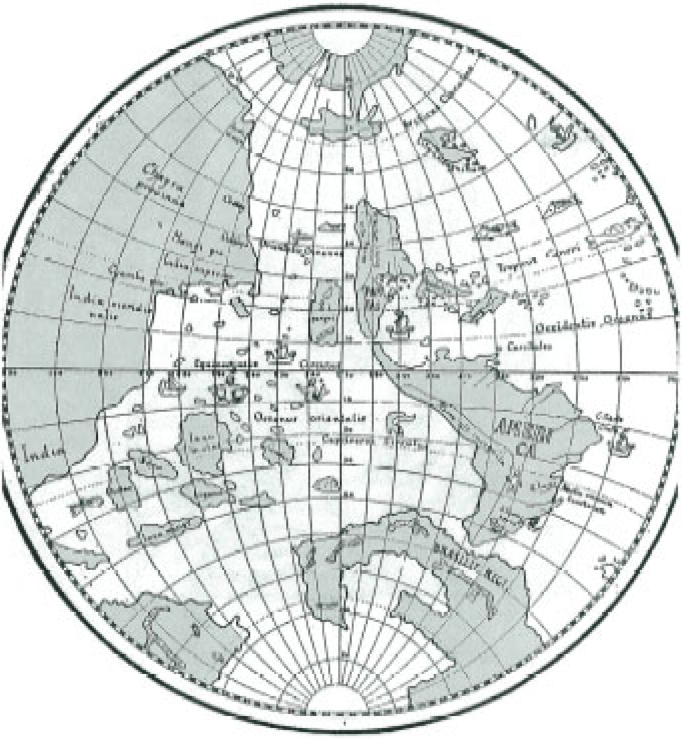


Fig. 26. Hemisphere, Johann Schoner, 1515. The "strait" through America into the Pacific is probably the Rio de la Plata. Note the entirely coincidental similarity of the landmass in the southwest Pacific to eastern Australia.

Columbus's discovery of America threw the status of the Atlantic into dispute. The Genoese explorer originally claimed to have succeeded in reaching the Orient. Caribbean shores encountered during his first two voyages were said to be Asian islands, and Cuba perhaps a part of the Asian mainland. But in 1498, skirting a newly discovered landmass, he encountered a river which discharged such an enormous volume of water into the sea that he deemed the land to be an unknown continent. The river was probably the Orinoco, and the land was, of course, South America. Although the region to the north was envisioned as only islands rather than a North American continent, the ocean's partitioning into the Atlantic and Pacific had begun. This brief transitional stage is seen in the meticulously conceived world map of Johann Ruysch of 1507, on the map of Zorzi/Columbus (Fig. 27), and is still found as late as 1528 on the rough map of Pietro Coppo.

Continuing encounters with the Caribbean islands showed that they bore little resemblance to the Indies described by Marco Polo. Landfalls in Central America, as well as probable encounters with Florida before its recorded European discovery by Ponce de Leon in 1513, led to the theory that these new, closely knit discoveries were, in fact, all part of a heretofore unknown, fourth part of the globe.

This belief was given life in 1507 when a group of humanists, among them the geographer Martin Waldseemuller, met in St. Die under the patronage of the Duke of Lorraine. Waldseemuller sifted through geographic data garnered from recent voyages and produced a radical, brilliant map of the world which laid down the elementary outlines and position of America, and rendered both North and South America as separate landmasses from Asia, thus clearly partitioning into two the waters between Europe and Asia (Fig. 28). This was the true cartographic birth of the Pacific Ocean.

Waldseemuller splits his map's cordiform through the Pacific, with the large island at the 2:00 position being Japan. The waters between Asia and America are labeled as the "eastern" ocean, and those between America and Europe as the "western" ocean. This prototype was used by other geographers, among them Glareanus (1510, Fig. 29), Stobnicza (1512), Apianus (world map of 1520 and volvelle of 1524, Fig. 2), and Honter (1546, copying Apianus).

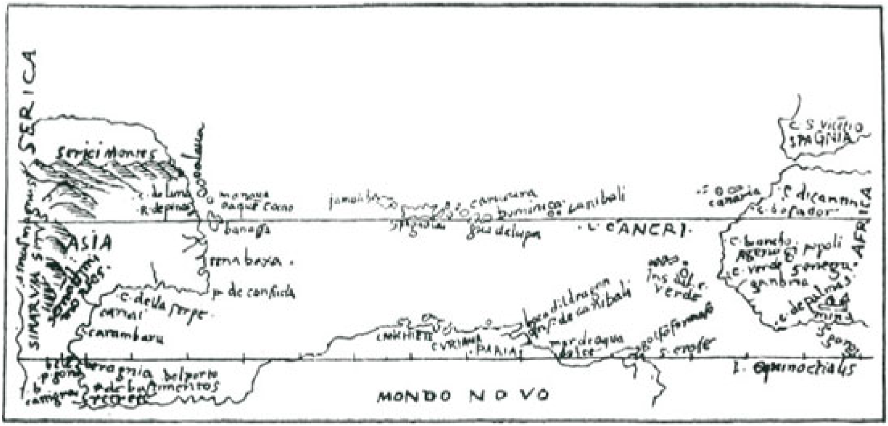

SERICA
serici montes
ASIA
SINARVM SINUS
c. della serpe
carambaru
banaga
terra baxa
p. de conficda
jamaica
canibali
guadelupa
L. CANCRI
c. S. vicenzo
SPAGNIA
canaria
c. bojador
AFRICA
c. verde
senega
ganbra
Ins. de c. verde
paria
curiana
mar de aqua dolce
golfo fermoso
s. croce
L. Equinochialis
MONDO NOVO
belporto

Fig. 27. A. Zorzi /B. Columbus, 1506-22. Because of its latitude, Cattigara (lower left) would soon be transplanted from Southeast Asia to Peru *(Mondo Novo).*

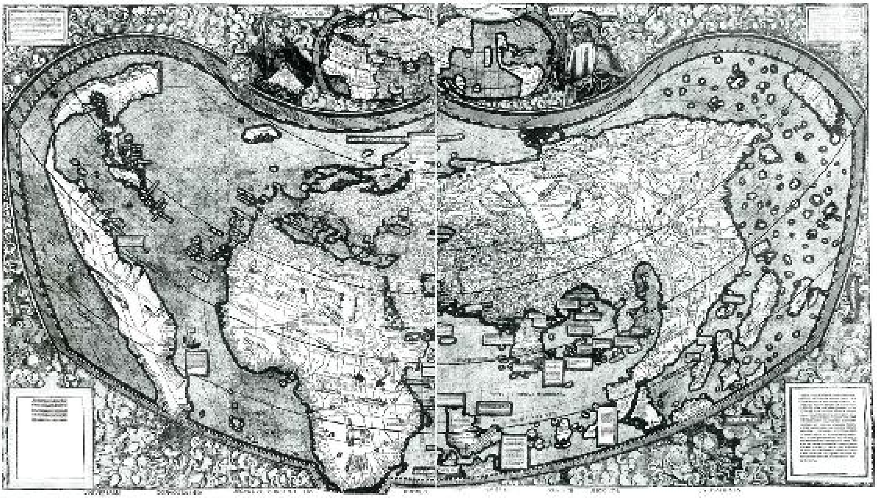
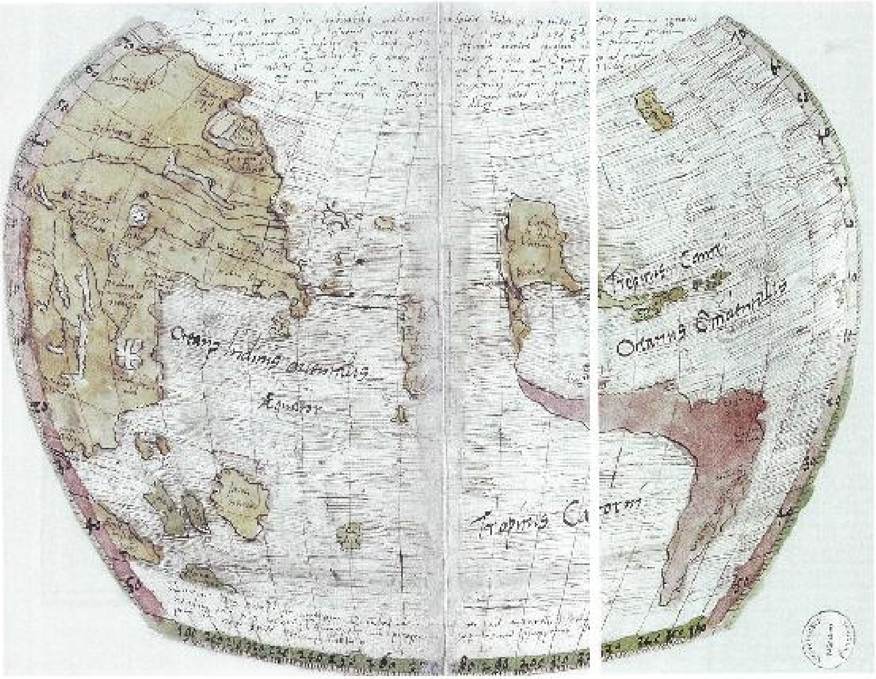


Fig. 28. Waldseemiiller, 1507. One of the greatest achievements in Renaissance mapmaking, this map was the first to depict the New World as an autonomous landmass of continental proportions, and thus the first to separate the sea between Asia and Europe into two distinct oceans. The profusion of islands in the Pacific, including Japan in the upper right, were inherited from late fifteenth-century models. America was envisioned as extending about as far south as Africa, an opinion Waldseemiiller made more evident in a globe of the same date. When explorers searching for a route into the Pacific found the Rio de la Plata, which by coincidence lies at about that latitude, its vast mouth was likely interpreted as a strait, thus creating the pre-Magellan waterway to the Pacific mapped by such scholars as Schoner (Fig. 26). [From a facsimile]



Left-. Fig. 29. Hemisphere, Henricus Glareanus, ca. 1510. The "true" Pacific, formed from the partition of an autonomous America, with Japan at the center. [Cim. 74, Universitatsbibliothek Miinchen]

Glareanus was perhaps the first geographer to make maps focused on the Pacific. His hemisphere labels two islands in the mid-Pacific, the larger, upper one being Japan *(Zipangri*) and the lower being *Candin.* There is no reliable identification of this latter island; it is found on several earlier *mappaemundi,* such as the Genoese world map of 1457, and was adopted by Martellus and Waldseemiiller, among others. Behaim noted on his 1492 globe that this island is a place which lies "foot against foot" (that is, on the part of the earth opposite Europe), and thus where "when it is day with us they have night, and when the sun sets with us they have their day." This consideration influenced Glareanus's decision to locate *Candin* in the mid-Pacific.

Two Patterns of Early Pacific Mapping

At this point, however, the evolution of the Pacific diverges into two separate paths. Along with the "correct" one of Waldseemiiller, who theorized that America was an autonomous continent which decisively split the waters between Asia and Europe into two, came a "false" Pacific, though no less rationally conceived. This alternate Pacific was created when America was identified with a mammoth Southeast Asian subcontinent found on several maps of the late fifteenth century. Some theoreticians concluded that the newly discovered American continent was, in fact, that Asian subcontinent which, the reasoning went, earlier geographers had placed too far to the west. The "true" and "false" Pacifies coexisted for the first half of the sixteenth century.

In the detail shown from the 1532 world map attributed to Holbein and Minister (Fig. 31), the mermaid swims in the "true" Pacific. The "false" Pacific was created when geographers identified the subcontinent to her immediate left as being America, and the sea forming its western shores as the Pacific. The theorists who proposed this erroneous interpretation, creating an alternate Pacific by expanding the Indian Ocean, were as devoted as Waldseemiiller, and assessed tidbits of evidence as compelling as his.

To see how this happened, we need to backtrack to the Ptolemaic concept of the earth, such as exemplified by the woodblock rendering from the 1482 Ulm issue of the *Geographia* (Fig. 30). Although the Alexandrian cosmographer Claudius Ptolemy lived in the second century AD, his *Geographia* was widely studied in the fifteenth century, having been translated into Latin by 1406.

Note that an arm of land extends from Southeast Asia and wraps around the lower right of the map, connecting to Africa and rendering the Indian Ocean a closed sea. But serious geographers perusing Ptolemy's map in the later fifteenth century knew that the Indian Ocean was doubtfully landlocked, and that beyond Malaya lay many islands. Even if they did not know that

Javan and Arab merchants routinely plied between the Indian Ocean and South China Sea, several European travelers had demonstrated this as well: Marco Polo had returned to Europe by sailing to Persia from China, Friar Odoric sailed to China through the Indian Ocean, and Nicolo de' Conti had sailed to the Spice Islands.

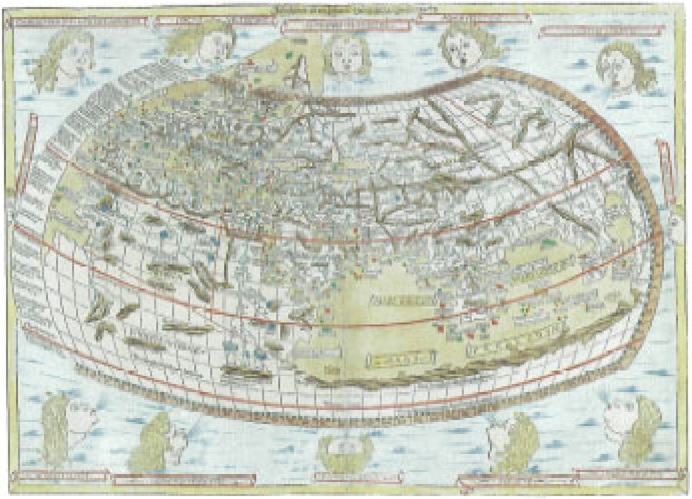


Fig. 30. World, Ptolemy's *Geographia,* Ulm, 1482 (1486). [Martayan Lan, NY]

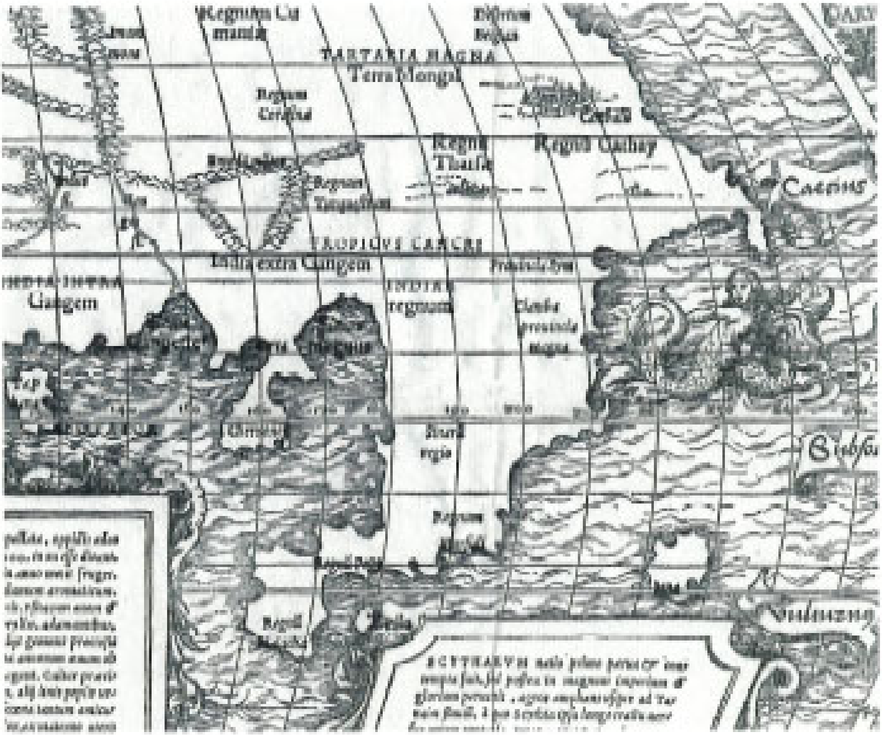

Regnum Camania
TARTARIA MAGNA
Terra Mongal
Regnum
Regnu Cathay
Regnu Thaiat
Regnum Tangut
Cathay
TROPICVS CANCRI
India extra Gangem
INDIA INTRA Gangem
INDIAE regnum
Ciamba provincia Magna
Regnum
Regnu

Fig. 31. Detail of world map attributed to Hans Holbein and Sebastian Minister, 1532. Ptolemy's *Sinus magnus* (left) properly remains as the Indian Ocean.

Thus, several fifteenth-century *mappaemundi* pried open the land bridge as part of a radical overhaul to the Ptolemaic pattern. In about 1490, Henricus Martellus's answer was to open the ocean by yanking the land bridge away from Africa, leaving it as a vast subcontinent. Soon afterwards, the discovery of America appeared to many geographers to confirm the existence of this subcontinent.

To envision this, go back to the Ptolemaic map in Fig. 30. Imagine holding Ptolemy's Africa in your left hand. Then, with your right hand, take the land bridge at the lower right of the map and pull it eastward, breaking it free of the horizontal southern segment. Now pepper the eastern segment with Spice Islands in the China Sea, and what you have left is the basic Martellus pattern.

When Columbus and those who followed him reached a continent in the "same" place as Martellus's Southeast Asian subcontinent, the inference was obvious. America was the eastern segment of Ptolemy's land bridge, and the sea immediately west of it, a region of the Indian Ocean Ptolemy called the "Great Gulf," was the Pacific Ocean. (Similarly, once the belief in an austral continent came into vogue, it could be seen as the southern, east-west segment of the land bridge, which Ptolemy, in his imperfect understanding, had placed too far north.)

When you pried the Southeast Asian land bridge away from Africa, the rightmost finger of your right hand would have wrapped around an entrepot called *Cattigara* on the southeasternmost shore of the Indian Ocean. Ptolemy's *Geographia* contains an account of a voyage to this port city by a navigator named Alexander. The "Great Gulf" on whose shores it lay was probably the Gulf of Siam or South China Sea, and Cattigara was probably in what is now Vietnam. But once the "false" Pacific was created from Ptolemy's "Great Gulf," Cattigara, it seemed, must lie in Peru, and Alexander must have crossed the Pacific and back, two millennia ago. This concept remained even when the geography did not: at the end of the sixteenth century, Ortelius makes clear in the text accompanying the *Maris Pacifici* (Fig. 58) that he believed Ptolemy's "Great Bay" to have been the Pacific Ocean.

This cartographic metamorphosis can be seen in progress on the 1522 sketch map by Alessandro Zorzi and Bartolomeo Columbus (Fig. 27). The land on the left is both Asia (interior) and North America (coast). The long coast running along the center bottom is South America, with the Caribbean islands above. But most important for the cartographic fate of the Pacific is the neck of land in the lower left connecting it to Asia. This is a combination of Southeast Asia, Central America, and part of western South America. In the bottom left corner is *cattigara,* placed below the equator (the lower horizontal line) to conform to Ptolemy's assigned coordinate of 8° 30' S latitude.

Next, when geographers realized that South America lay far from Southeast Asia, the breadth of the "Indian" Ocean was simply increased and Cattigara, now lying south of any continental land known in Asia, was stranded in South America. Hence, it became "obvious" to anyone perusing the result that Ptolemy's "Great Gulf" was really the Pacific Ocean. Everything fit nicely into place. America and Asia need not even be severed from each other.

This, in fact, is how Vasco Nunez de Balboa, the first European to see the Pacific from American shores, probably envisioned the ocean. When in 1513 Balboa crossed the Central American isthmus at Darien, he referred to the open ocean to the south as the "South Sea," probably believing that he had crossed an enormous Amerasian peninsula similar to that depicted by Fine (Fig. 33). He doubtfully envisioned his ocean as a "discovery" *per se*. Rather, he probably thought he had finally found the eastern shores of an extended Indian Ocean.

An alternate theory about Cattigara achieved the same basic result. Let us return to the east-west breadth of the Ptolemaic land bridge we set aside a few paragraphs above. Just as the "vertical" section of the land bridge was thought to be Ptolemy's misunderstanding of America, so was the "horizontal" section a misunderstanding of Terra Australis. The sixteenth-century Spanish explorer Pedro Sarmiento believed Alexander's sailing time to have been forty days and determined the location of Cattigara to be on the Pacific shores of a great southern land. That Cattigara was celebrated as a rich entrepot would soon support the belief that this southern Pacific continent would bring great wealth to whoever first discovered it. Sarmiento, it is no coincidence, accompanied Mendana on his voyage in search of the Solomons.

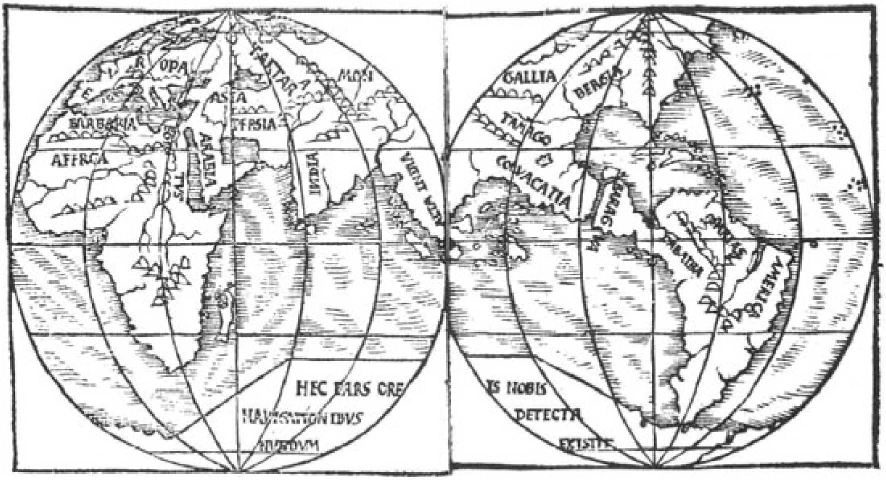


Fig. 32. In this world map of ca. 1527, Franciscus Monachus created the Pacific by expanding the Gulf of Siam and eastern Indian Ocean. From left to right, a "modern" (non-Ptolemaic) India is followed by Malaya, spanning across the hemispheres. A wide gulf separates Malaya from the last "Asian" peninsula, which is Mexico, and a hoped-for strait separates Mexico

from the rest of the continent. Far to the north, Mongolia (*Mongallia*) spans the China-Amerasian interior, and *Bergia,* a place mentioned by Marco Polo, designates the Gulf Coast of North America. Reproduced from Henry Harisse, *Discovery of North America,* 1892.

The "false" Pacific pattern reached its height with the world maps of Oronce Fine (Fig. 33). Despite the relative sophistication of Fine's depiction of the New World, Cathay *(Catay*) occupies the region of Texas, *Mangi* (southern China) is in Mexico (even Johann Schoner believed that Marco Polo's *Quinsay was* Mexico City), and of course telltale Cattigara lies on the coast of Peru. If one compares the land bridge in Ptolemy's world map (Fig. 30) to the Pacific coastlines of Fine's America and Terra Australis—despite the vast difference between them, they are in fact the "same." Fine created America and Terra Australis by enlarging Ptolemy's landlocked Indian Ocean and remaking its eastern and southern shores. The resulting Indian/Pacific Ocean is still nearly landlocked, open only through the narrow Magellan Strait and a wider passageway by southern Africa and Madagascar.

On the Eve of Magellan

When in 1520 Ferdinand Magellan successfully navigated the strait named after him (but dubbed the "Strait of Patagonia" en route) and crossed the ocean, how did he envisage the world? Antonio Pigafetta, who accompanied Magellan and chronicled the voyage, explains that Magellan "had to sail through a very hidden strait, as he had seen in the archives of the king of Portugal, on a map drawn by a worthy man named Martin of Bohemia." Magellan, in other words, had seen a map by (or after) Martin Behaim and envisaged himself sailing around its Martellus-type Southeast Asian subcontinent, which was then understood as an Amerasian subcontinent.

That Pigafetta's geographic concept of the Pacific did not change even after the voyage is revealed in his manuscript: "During these three months and twenty days," he wrote of their Pacific crossing, "we were in an open gulf," his use of *gulf being* the key word. How wide was his "gulf"? "We were in an open gulf, where we must have covered four thousand leagues through this Pacific Ocean." A Spanish league equaled about 5.9 kilometers. They were not naive to the staggering breadth of ocean they had traversed.

This "Indian Ocean" lineage was adapted to more current information by the eminent Italian cosmographer Giacomo Gastaldi on his world map of 1546 (Fig. 36) and on his *Carta Marina* of 1548 (Fig. 62). On the latter, the peninsula on the left border of the map contains southern China, Burma, and Malacca. Directly below it lie Sumatra and Java. *Gilolo* (Halmahera) and *Huban* (a Philippine island from Magellan) lie to the east, in the gulf formed by Malaya and America. Balboa's *Mar del Sur* ("South Sea") denotes only the water immediately below Central America.

Just as Magellan set out on his circumnavigation in 1519, Lopo Homem, Pedro Reinel, and his son Jorge Reinel, produced a collection of charts now known as the *Miller Atlas* (Fig. 35). Believed to have been commissioned by

Portugal's King Manuel for Francois I of France, the work was embellished with the assistance of the artist Gregorio Lopes. The geographers' evident wish for a global coverage presented the opportunity to draw from the latest explorations in Africa and the New World, the charts of which clearly are a foothold in the empiricism of the Renaissance.

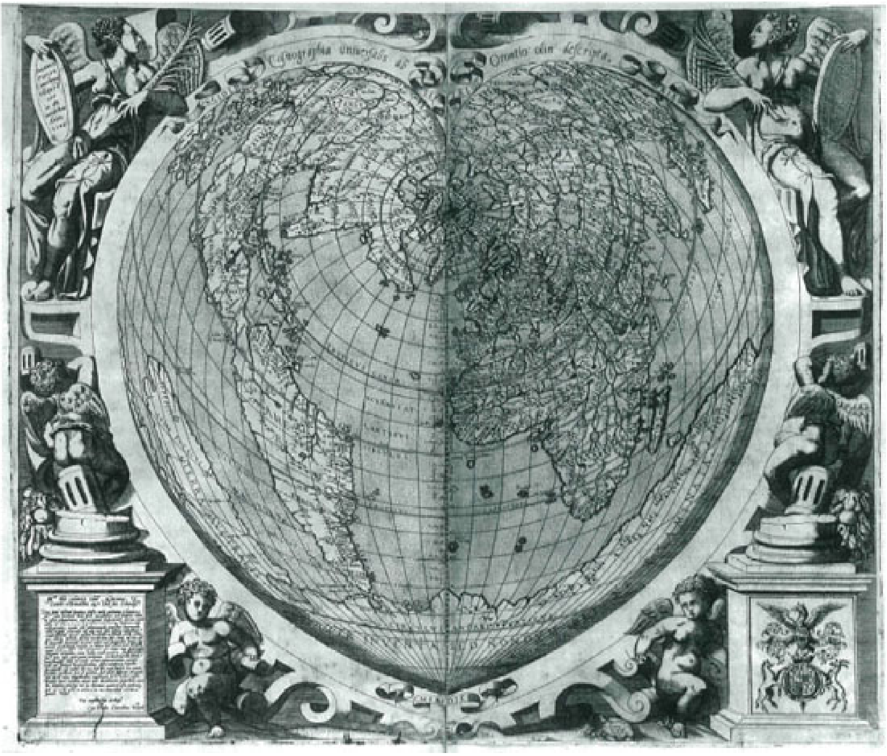


Fig. 33. Oronce Fine set his geographic ideas to paper with a double-cordiform map in 1531, and this single cordiform in 1534 (Cimerlino, 1566). Fine was the first to publish maps extensively tapping data from Magellan's voyage. America is a subcontinent of Asia, and the Pacific is vastly undersized, having been rendered a large gulf.

We see that influence of new discoveries wane in the work's map of Southeast Asia, which mixes Arab and medieval data with a flawed representation of the then-recent Portuguese conquest of Malacca. But this genre, unlike that of portolan charts, forgave speculation so long as it was cloaked in beautiful images, and so they continued east to the "Pacific" (Fig. 35). Here, the mapmakers were forced to step back to a more medieval approach, mapping from inference and camouflaging the uncertainty with vignettes, yet at the same time marking latitudes as though geographic placement had some meaning. Said in the title to be a map of the "great gulf in the China sea"—that is, the Pacific Ocean formed from the eastern section of Ptolemy's Indian Ocean—the Pacific "gulf" extends to 45° north, about the latitude of northern Hokkaido, further north than later mapped by Fine or

Gastaldi. The kingdoms and islands placed in this "Pacific" and its shores were extracted from Ptolomaic, medieval, and Arab sources.

Extant European mapping of individual islands begins in about 1515 with a series of sketches by Francisco Rodrigues. Little is known about Rodrigues, save for what is mentioned in letters by Albuquerque, the Portuguese conqueror of Malacca. His maps were apparently copied from Indonesian or Arab originals. According to a letter sent by .Albuquerque to his king in April 1512, he had a map "which had the names in Javanese writing," but which he could translate because "I had with me a Javanese who could read and write." Albuquerque sent with his letter a copy of the map "which Francisco Rodrigues has traced."

In another letter to the king, Albuquerque wrote that Rodrigues had accompanied an expedition he had dispatched to the Moluccas under de Antonio de Abreu. Rodrigues was "a young man who has always been in India as a pilot, and he knew very well how to make a map if necessary, and this is why [I] sent him there." Aided by Malay pilots, they reached as far as Banda. It was with such sharing of geographic knowledge and piloting skills that the Portuguese began penetrating the western Pacific.

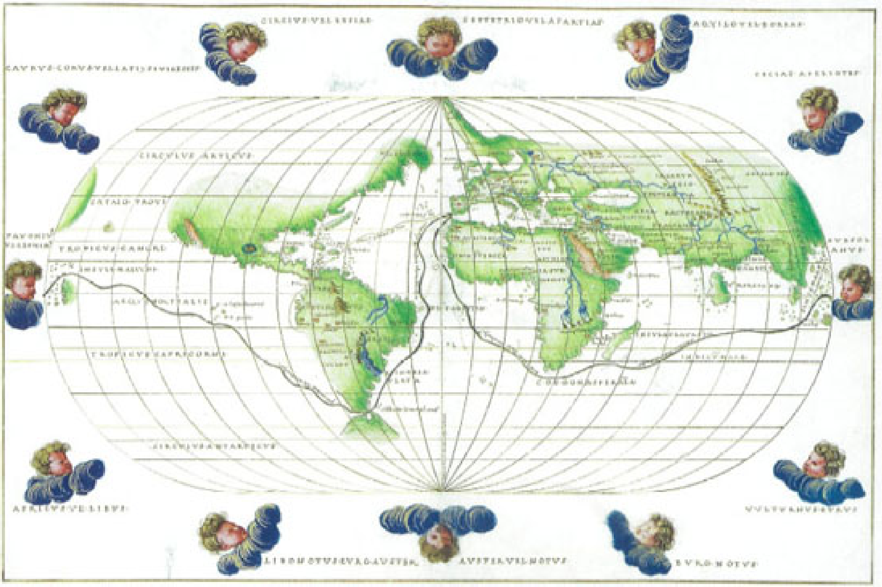


Fig. 34. World map recording the tracks of Magellan, Battista Agnese, ca. 1544. [Library of Congress]

The Pacific's East-West Breadth

Along with de Abreu and Rodrigues, the Portuguese expedition to the Moluccas carried one Francisco Serrao. Misfortune and adventure worthy of a novelist's pen brought Serrao to Ternate (Moluccas), where he set himself up as a facilitator of Portuguese trade between the Spiceries and Malacca. What is important to our story is that he wrote letters to an old friend who had taken part in the conquest of Malacca but had since returned to Portugal—Ferdinand Magellan. Serrao, boasting of the virtues of the Moluccas, suggested to his friend that they lay so far east as to be more easily accessible by a voyage west, around the New World, a scenario made even more viable by the underestimation of the size of the Pacific. Magellan failed to convince the Portuguese crown of the feasibility or political wisdom of attempting such a voyage, but ultimately won support from Spain, and in 1519 set out on the maiden circumnavigation of the earth (Fig. 34).

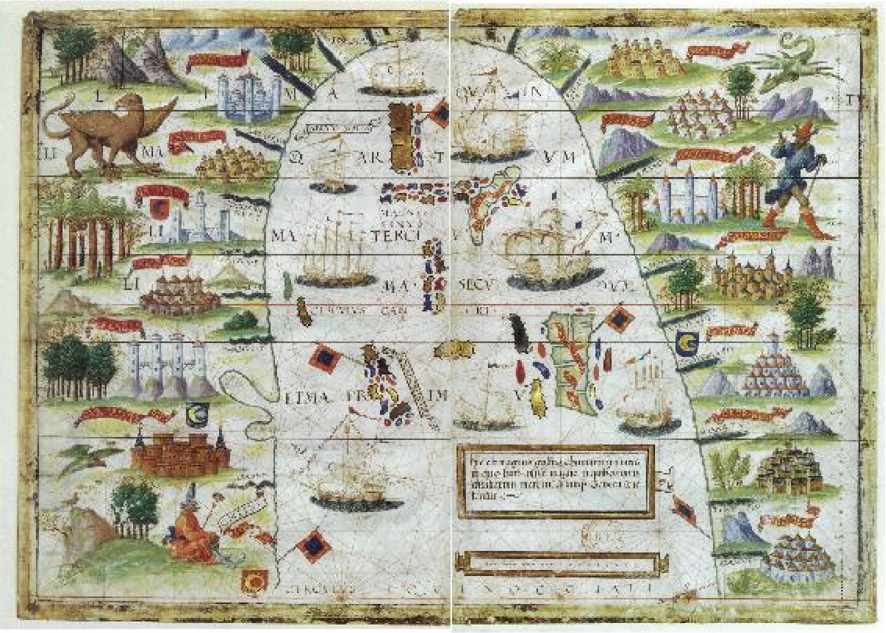
The reports given by the survivors of the Magellan expedition should, one would have thought, immediately laid to rest any significant underestimation of the size of the Pacific. "More vast than mind of man can conceive," was the way Maximilian of Transylvania described the ocean, based on his interviews with the expedition's survivors. For the cartographers of the Spanish court, data from the voyage did indeed result in an immediate expansion of the ocean, exemplified by the charts of the first cosmographer of the Casa de Contratacion, Diego Ribero. Such charts were confidential and had no influence on their printed contemporaries.

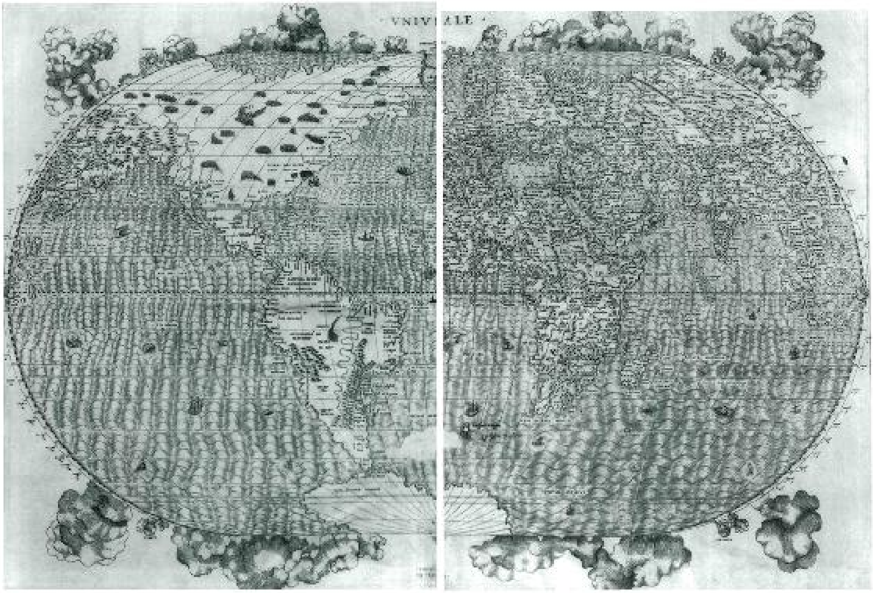
Yet something went queerly wrong when the voyage was first tapped for printed maps. Its initial impact was the opposite of what one would expect. In the late 1520s, the brilliant cartographer Oronce Fine labored with Pigafettas text to produce his radical new world map, which when published in 1531 was the first to extensively exploit the voyage's data (1534-66 version, Fig. 33). Ironically, however, his meticulous efforts to incorporate Magellan's data resulted in his further undersizing the Pacific.

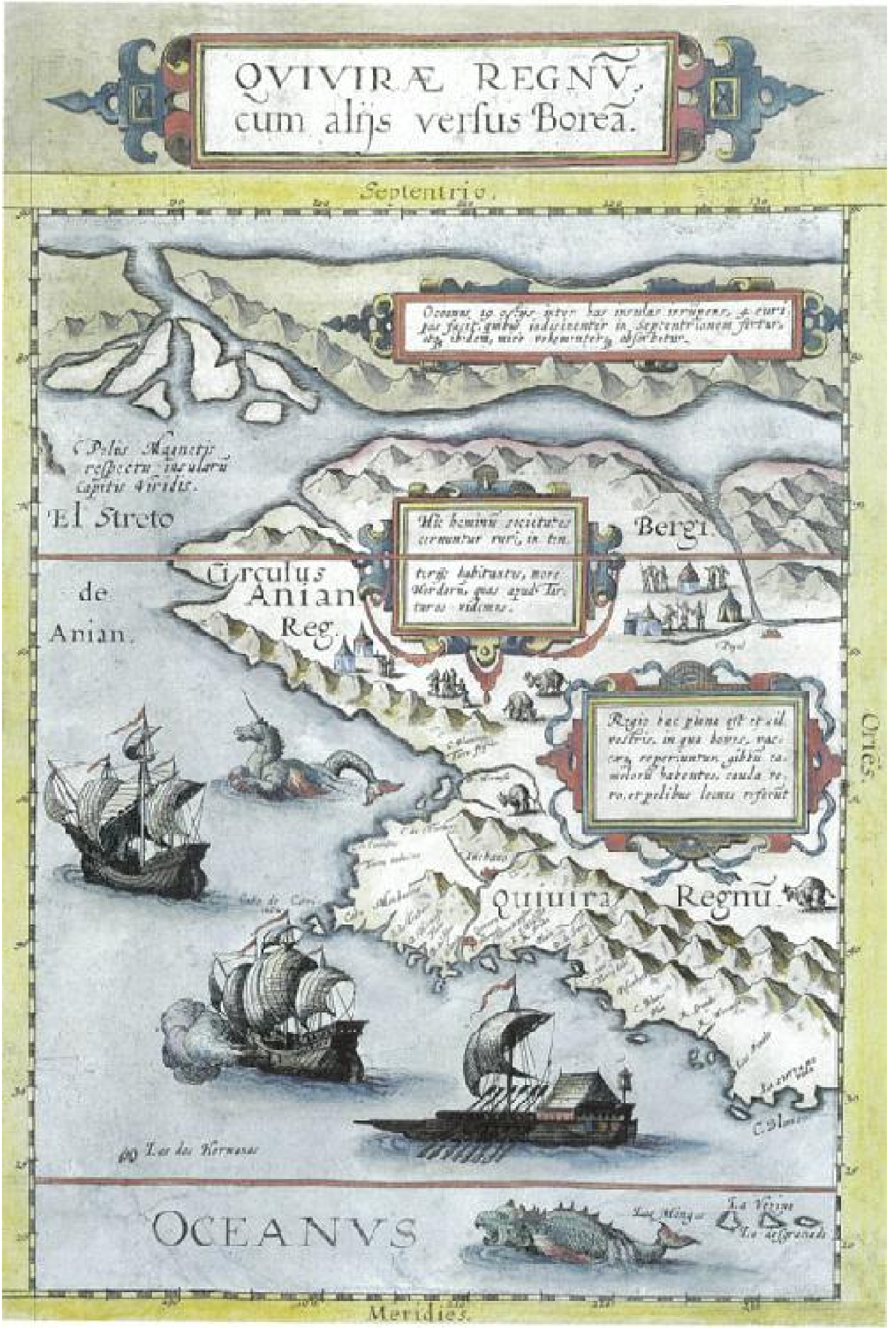
How could this have come to pass? How could any mapmaker read of the expedition's odyssey across the Pacific and abbreviate it even further? Fine, ironically, was led astray by an error in the source he consulted for information on the voyage. Working in Paris, he almost certainly tapped the original French edition of Pigafettas journal, published in that city in 1525. In that work, Fine found what appeared be to be the ideal data for sizing the Pacific—the actual longitudes calculated during the voyage.

Longitudes noted in the course of the expedition's Pacific crossing were calculated west from the Line of Demarcation set by papal bulls and treaties, which ran roughly running along the longitude of western Brazil. A fateful error, however, had crept into the printed edition. Rather than citing the longitude as degrees west from the Line of Demarcation, as Pigafetta had done, the text refers to the figures as longitude west from the line of *departure*. That meant that Fine was studiously plotting his Pacific reference points west from Seville rather than western Brazil, thus cheating the Pacific of a breadth roughly equal to the entire Atlantic Ocean.

Overleaf. Fig. 35. Chart of the Pacific Ocean from work now known as the *Miller Atlas,* ca. 1519. The voluptuous work was produced by the chartmakers Lopo Homem, Pedro Reinel, and his son Jorge Reinel, assisted by the artist Gregorio Lopes. It is believed to have been commissioned by Portugal's King Manuel for Francois I of France. [Bibliotheque Nationale, Paris]






QVIVIRÆ REGNV. cum alijs versus Boreā.
Septentrio.
C. Polus Magnetis respectu insularū capitis Viridis.
El Streto de Anian.
Circulus
Anian Reg.
Hic hominū societates cernuntur rari, in ten. torijs habitantur, more Hordarū, quas apud Tartaros vidimus.
Bergi.
Oriēs.
Quiuira Regnū.
Las dos Hermanas
OCEANVS
La Vergine
La desgraciada
C. Blanco
Meridies.

The issue was never clarified because newer data soon rendered figures from the Magellan voyage irrelevant. Writing in 1553, the English chronicler Richard Eden still speaks of their position "in longitude from the place from whence they had departed."

The Pacific's North-South Limits

Most of the Asian and American coasts forming the east-west outlines of the Pacific soon became tolerably fixed on maps. Dis covering the ocean's latitudinal breadth, however, involved voyages to inhospitably frigid seas, and these remained little known on the north, and altogether mysterious on the south, until the early nineteenth century.

The search for *Terra Australis,* continental land in the southern Pacific, dominated Pacific exploration and theory from the mid- sixteenth through the latter eighteenth century. Even voyages that focused on the islands of the tropics, seemingly removed from any preoccupation with continental southern shores, were still guided

by the common cause of a vast, populated coast defining the ocean's southern perimeter, the discoverer of which would bring wealth and fame to him and his country. Terra Australis would not easily surrender to explorers' failure to find it; instead, it underwent amorphous incarnations whenever an unknown coast was sighted but not circumnavigated.

First postulated by the ancient Greeks, Renaissance Europe found corroboration of continental southern Pacific shores in Judeo-Christian texts. It seemed to some at the time to be the region to which Solomon's ships had sailed to secure precious materials for the fabled temple, and indeed the idea that the Lost Tribe of Israel would be found in the Pacific was a recurrent idea. All this blended together into a formidable coast that would not easily erode from failure to locate it.

The elusive entrepot of Cattigara became entwined in this nearly mystical search for Terra Australis. Finding Cattigara had been one of Magellan's goals, but his failure to find it where Ptolemy had prescribed was hardly its epitaph. After its appearance on the coast of Peru by Zorzi, Fine, and Munster, the influential Pedro Sarmiento, who accompanied Mendana on the discovery of the Solomons, concluded that Cattigara lay on the Pacific shores of Terra Australis, and was inhabited by Jews. Sarmiento had good reason to doubt the Peruvian location given it by some of his con temporaries —he was in Peru. For him, "Cattigara" was "the land which the describers of maps call the unknown land of the south."

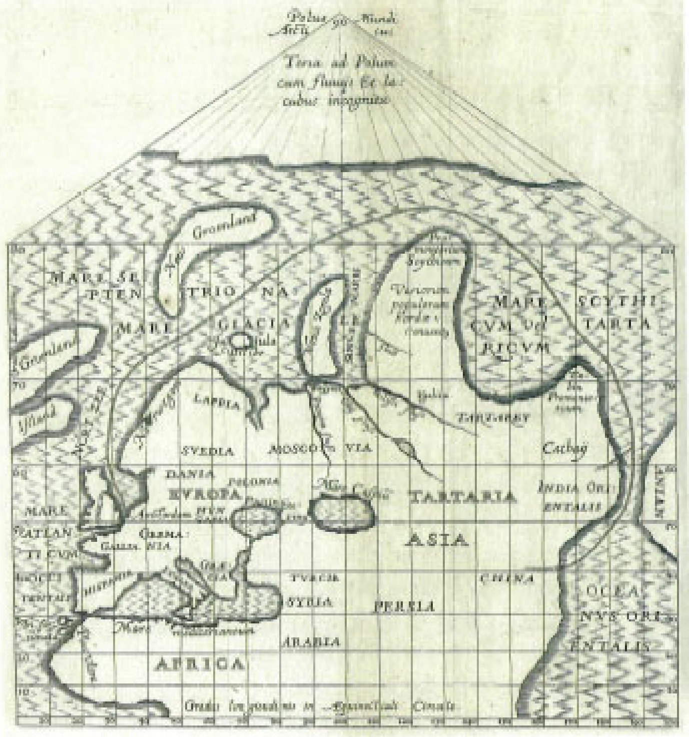
A rabbi named Aaron Levi wrote a treatise entitled *Muckwa Israel which* stated that the "white" or "olive skinned" people who are said to inhabit the "southern lands" are descendants of the ten tribes of Israel. Jean Surville's voyage to the Pacific in 1769 was motivated in part, according to rumors circulating in India at the time, by the search for a South Sea island in which a colony of Jews had settled, though he was probably following indistinct rumors of the discovery of Tahiti. Even coordinates were flaunted—102° west of Paris, 27 or 28° south, an area of empty ocean.

Although an ancient concept, the "empirical" incarnation of Terra Australis occurred when Magellan sailed through the strait now bearing his name. Many geographers assumed, whether or not Magellan himself did, that the land lying to the south—in reality Tierra del Fuego—was part of the great continent. Sixteenth-century renderings of the continent are numerous, and include Monachus (Fig. 32), Fine (Fig. 33), and de Jode (Fig. 56).

Terra Australis and Other Enticements

The most dauntless champion of the belief that an extensive temperate continent formed the southern shores of the Pacific came in the eighteenth century in the person of Alexander Dalrymple. Brilliant, capable, and passionate in his pursuits, Dalrymple originally had been the candidate to lead the circumnavigation ultimately given to James Cook. His life had a tragic cast to it: first, an obsession to make Balambangan (Borneo) into a British free port, though a clever concept, ended in disaster, and then his maniacal research into proving the existence of the southern continent culminated just when it was being categorically disproved. In 1773, Cook, leading an expedition Dalrymple might have had as his own, crossed the Antarctic Circle without encountering land, distancing the collective consciousness from the austral continent. He died before Antarctica was discovered.

Previous pages: Fig. 36. World map by Giacomo Gastaldi, 1546, the progenitor of a sequence of maps continuing through the end of the century. *Opposite:* Fig. 37. Cornells de Jode, 1593. The first printed map specifically devoted to North American shores of the Pacific. *Quivera,* the mythical kingdom sought by Coronado, appears in the south, in what is now California. To the north lies the kingdom *of Anian,* which when transplanted there by Giacomo Gastaldi from Marco Polo's Asia, became the origin of the hypothetical Strait of Anian. Cape Mendocino is accurately placed at just above 40° east. The Arctic region is depicted according to Mercator, who in turn derived it from a medieval text, and the magnetic pole is shown, its declination from the perspective of the Cape Verde Islands. From the *Speculum* of Cornells de Jode, 1593. *Below:* Fig. 38. An easy northern route into the Pacific was sought above the New World and, as shown hypothetically on this map, above Eurasia. Helisaeus Roslin, 1611.


Polus Arcti
Terra ad Polum cum fluuijs & lacubus incognitis
Groenland
MARE SEPTENTRIONA
MARE GLACIALE
MARE SCYTHICUM vel TARTARICUM
Groenland
Island
LAPPIA
SVEDIA
MOSCOVIA
DANIA
POLONIA
EVROPA
TARTARIA
ASIA
MARE ATLANTICVM
GERMANIA
GALLIA
HISPANIA
GRAECIA
TVRCIA
SYRIA
PERSIA
ARABIA
AFRICA
CHINA
Cathay
INDIA ORIENTALIS
OCEANVS ORIENTALIS

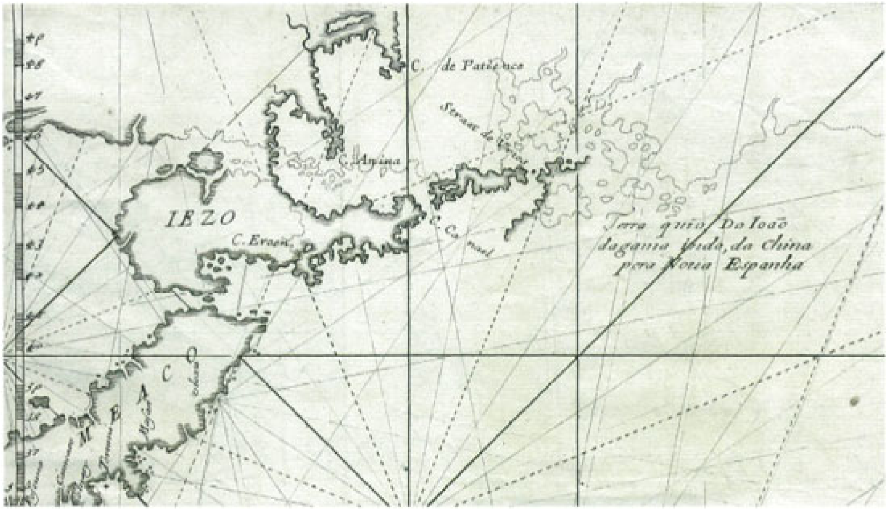

IEZO
C. Eroen
C. de Patientia
Straet de Vries
C. Aniwa
Terra quiuo Do Ioão dagama Vido, da China pera Noua Espanha

Fig. 39. Melchisedech Thevenot's interpretation of the discoveries of Maarten Vries and Joao da Gama, from his map of the western Pacific, 1664 (ca. 1690).

Whereas the Pacific's southern bounds were sought for the land supposed to lie there, the ocean's northern bounds were looked to for a sea route above America that would facilitate easy access between Europe and the Orient. In the earliest period, two principal theories coexisted: that North America was an island and open ocean north of it connected the Atlantic and Pacific; and conversely, that the Indochinese and California coasts were contiguous, running along temperate latitudes. Among the latter theory's greatest proponents was Giacomo Gastaldi, who shows the coasts thus in world maps of 1546 (Fig. 36) and 1548 (Fig. 62).

Late in his life, however, Gastaldi became deeply affected by a re-reading of Marco Polo's text. While in China, Polo had been told that a large gulf "extends for a two-month's sail toward the north, washing the shores of Manzi on the south-east and of Aniu and Toloman besides many other provinces on the other side." In light of the evolving knowledge of the Pacific perimeter, Gastaldi began to suspect that "the other side" was America, and thus that a strait separated it from Asia. In 1556, a map of America by Gastaldi was published in Ramusio's *Navigationi et Viaggi* that shows only a tentative land connection over the north Pacific, and five years later he made a map of the world depicting a strait between the two continents, placing Polo's *Tolman* in the American Northwest. He named the strait "Anian" after Polo's "Aniu." Aided by the influence of Gerard Mercator and Abraham Ortelius, the strait was almost universally adopted by the end of the sixteenth century. Cornells de Jode (fig. 37) was the first to take advantage of the strait to make a map devoted to the Pacific coast of North America, complete with the strait's namesake kingdom. In the Pacific north of the hypothetical strait, de Jode maps the magnetic pole, as detected from the position of the Cape Verde Islands. The discovery of the "real" Strait of Anian had to await Vitus Bering, who sailed the strait now named for him in the early eighteenth century.

Father Xavier, an early Jesuit in China, claimed that silver mines would be found in Japan. The intrigue deepened when rumors began to flourish of rich islands to the north of Japan, and in 1584 a Spanish captain, Francisco Gali, sailed from Macao to Acapulco and heard stories from his Chinese pilot about rich lands to the north. Gali claimed to have followed the leads and discovered four islands to the northeast of Japan abounding in precious metals and other desirable commodities. Two years later, Pedro de Unamuno was sent by the viceroy to Peru to investigate the islands, which of course were not to be found. Yet on Ortelius's *Maris Pacifici* of 1589 (Fig. 58) one already finds such an "island of silver" *(Isla de Plata*) above Japan.

The dream, indeed, was hard to shatter, and the Dutch East India Company sent Abel Tasman to investigate the "silver islands" in 1639, before his famous voyage to the Southwest Pacific. Not convinced by his failure to locate the islands, four years later the Company sent Maarten Vries to search for them. Vries' quest gave rise to more confusion when he perceived one of the Kuriles to be continental. This coast, which he named *Compagnies landt* for his employer, he believed to be the westernmost region of America, a concept that was widely adopted in the seventeenth and eighteenth centuries (for example, the *Mar del Sud* of Coronelli, Fig. 90). The strait named for him, separating Hokkaido from "Company's Land," is shown on the map from *Gullivers Travels* in Fig. 108.

At about the same time as Vries, documents came into the possession of the Portuguese chartmaker Joao Teixeira relating to a purported voyage in 1590 by a Portuguese merchant, Joao da Gama. Da Gama had supposedly sailed from Macao to Acapulco, where his papers were seized by Spanish officials. The papers included a sketch of a long north Pacific coast he skimmed en route. The map in Fig. 39, an engraved rendering of the Teixeira map, depicts da Gama's bogus coastline, emended by Thevenot to accommodate Vries' erroneous interpretation of his observations. Several mapmakers understood da Gama's land, conversely, to be a relatively small island (for example, Zatta, Fig. 21).

Actual exploration of the northern boundaries of the Pacific was not easily rewarded. In an undertaking which was humbling even by the arduous standards of early Pacific exploration, Peter the Great sent a Dane, Vitus Bering, to establish a port on Kamchatka to build a vessel with which to explore the easternmost limits of the Russian empire. In 1728, now sent by Peter's widow, Empress Catherine, Bering pierced through the strait separating Asia and America. The thick fog concealed Alaska on both his outbound and return journey, but a second, longer expedition brought Bering to the Northwest Coast of America, exploring some of the Aleutians, sighting Mount Saint Elias, and passing Kodiak Island.

Two principal schools of thought about the northern Pacific dominated the middle decades of the eighteenth century: cartographers exemplified by Delisle and Buache, who imperfectly adopted Bering's discoveries and flavored them with fanciful reports of purported discoveries by de Fonte and of a so-called "Sea of the West" in North America (seen in Zatta, Fig. 21); and Gerhard Friedrich Müller, who actively contested the Delisle-Buache mapping and argued for his own mapping of the Pacific north, which was based on a truer interpretation of Bering's discoveries.

Demystifying the Pacific's northern bounds began in earnest in 1778, when James Cook sailed north from the Society Islands for the American Northwest, discovering Hawaii along the way and reaching the mainland at what is now Oregon. He mapped the Northwest Coast nearly to the Bering Strait, getting some additional geographic data through a Russian trader in Unalaska (Aleutian Islands), who allowed Cook to copy his manuscript charts. After Cook's death upon returning to Hawaii, his surviving crew sailed back north, coasting Kamchatka and Siberia into the Arctic Ocean. The map of the northern reaches published with the official account of the expedition laid to rest many myths and ambiguities of the north Pacific frontier.

Many voyages, most balancing scientific pursuit with the pursuit of the fur trade, followed in quick succession. France sent Jean-Francois Galaup de La Perouse, whose atlas contained the first widely disseminated maps of San Francisco. Monterey, and San Diego. George Vancouver plied the Northwest Coast at about the same time as Spain's Alejandro Malaspina. Vancouver's maps, unlike those of the forgotten Malaspina, were published promptly enough, and disseminated well enough, to be influential.

In the early nineteenth century, Russia embarked on an intense series of northern Pacific exploratory and mapping endeavors. The voyage of A. J. von Krusenstern was followed by those of his brilliant protege, Otto von Kotzebue (Fig. 40). Russia's remarkably successful voyages continued through that of Frederic Lütke (Fig. 41), who explored and mapped the Bering Sea in 1827. Meanwhile, the French, English, and Americans were pushing the limits of the ocean's southern bounds, Antarctica having been discovered.

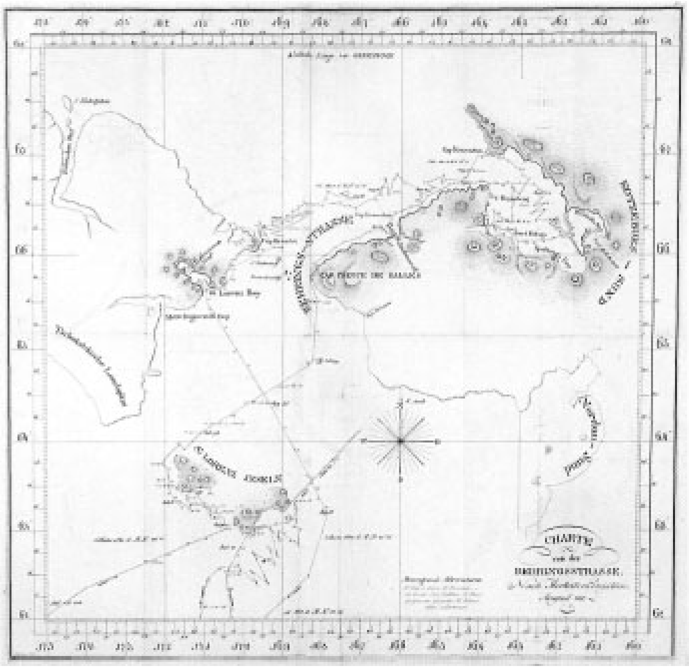
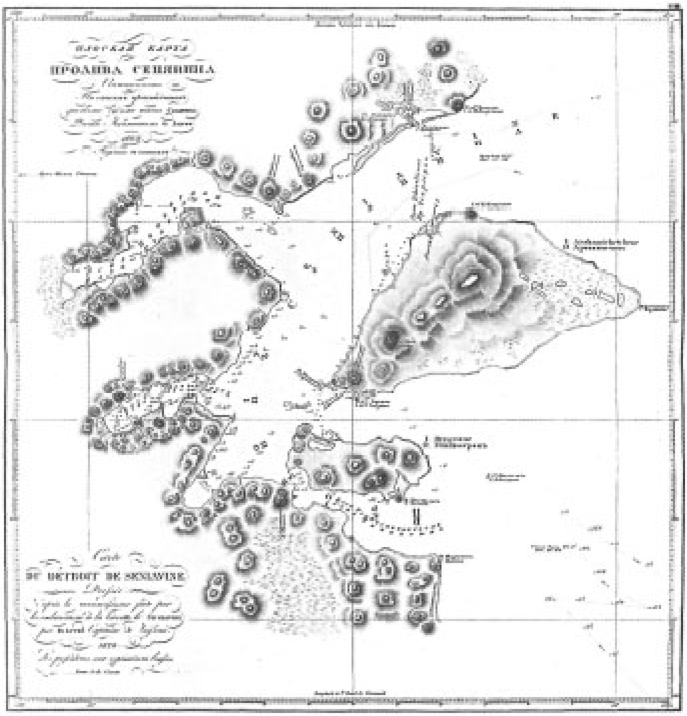
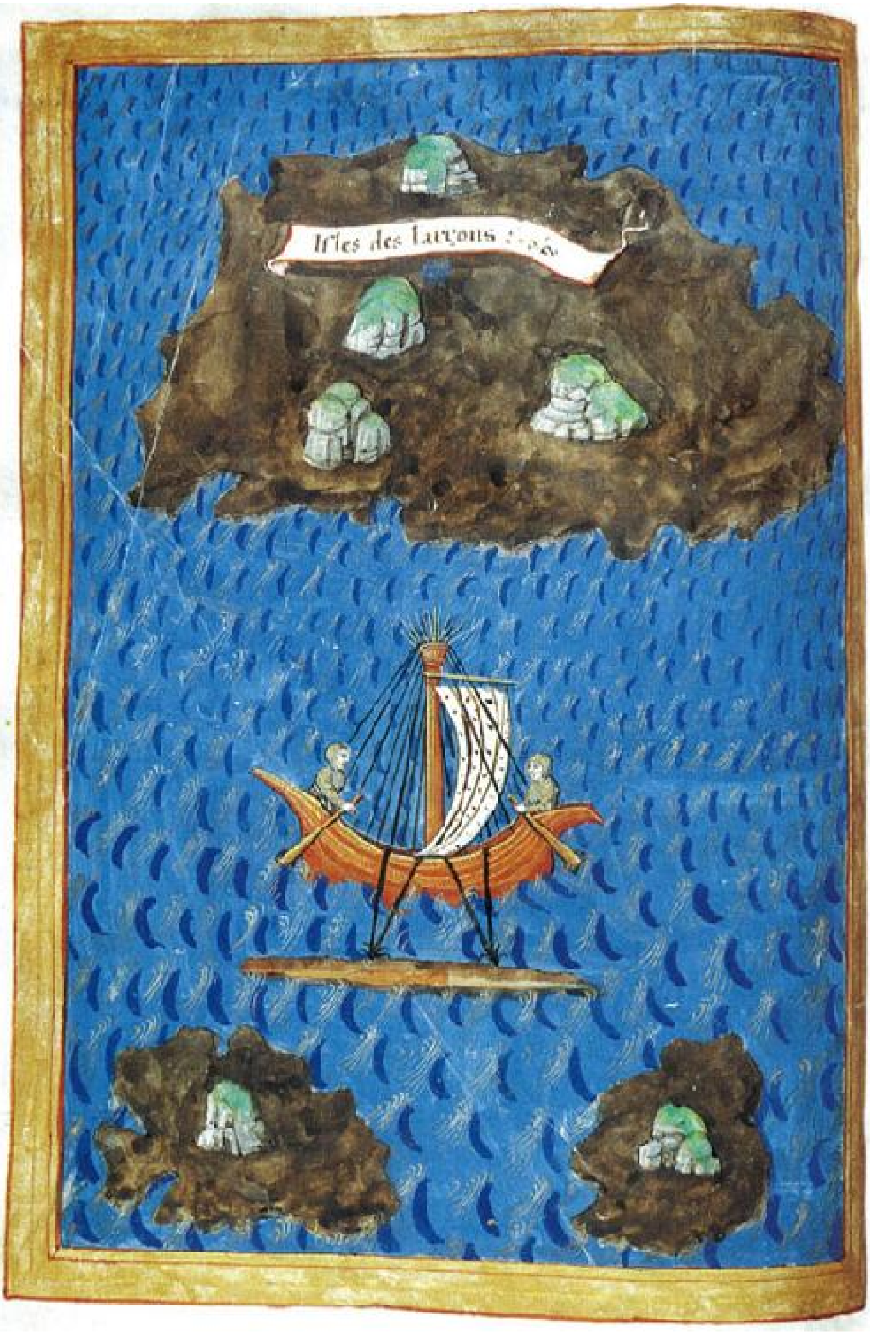


Fig. 40. When the Russian explorer Krusenstern was consulted by Count Romanzov about an expedition to search for a Northwest Passage, he recommended an alumnus of his own Pacific voyage, Otto von Kotzebue. The son of a dramatist who had authored a play about the ill-fated explorer La Perouse, Kotzebue penetrated the Bering Strait in July 1816. This chart was included with the 1825 Viennese account of his voyage.



ПЛОСКАЯ КАРТА
ПРОЛИВА СЕНЯВИНА
Carte
DU DETROIT DE SENIAWINE

Fig. 41. Chart of the Siberian Coast at the southern part of the Bering Strait, with the islands of Ostrov Arakamchechen and Ostrov Yttygran. From the hydrographical atlas of Frederic Lütke, ca. 1832.


Iſles des Larrons

Chapter 3

The Pacific Evolves after Magellan

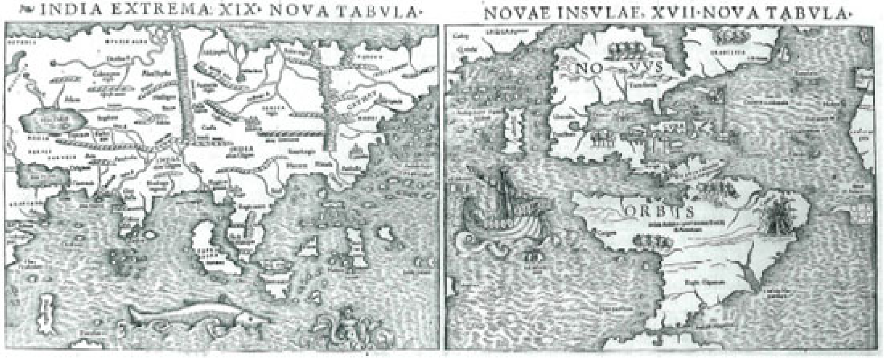
Spanish cosmographers such as Diego Ribero quickly drew upon Magellan's Pacific crossing, constructing charts based on the reports of the expedition's survivors for the exclusive eyes of their pilots and officialdom. Magellan's log and the charts compiled during the course of the voyage were tapped instead by Portuguese authorities, who had confiscated them from the *Victoria* and the *Trinidad in* the Moluccas. These primary records are no longer extant.

What do survive are images of various islands drawn by (or after) Pigafetta in about 1525 to illustrate his chronicle of the voyage. One depicting the Marianas shows one large and two smaller islands, following Pigafetta's description of having "discovered a small island to the northwest and two others to the southwest, one higher and larger than the other two" (Fig. 42). These represent Rota, their first sighting, and Guam. The third island was likely a portion of one of the other two.

The map's illustration of a native vessel prominently depicts the lateen sail which so impressed Magellan and crew. Poop and prow are nearly indistinguishable from one another, as Pigafetta described, this design allowing the boat to switch direction without having to be turned around. Tied to the main body with crosspieces is an outrigger to stabilize it. In other respects, the map's image deviates from the description. The sail hardly appears to be "made from palm leaves sewn together," as Pigafetta recorded in his text, nor is the boat itself black or white or red, the colors he noted. The Chamorros themselves are covered in monk-like robes, a stark contrast to the naked people he described. The illustration, rather, calls attention to Pigafetta's comment that these vessels reminded him of the gondolas which shuttle between Venice and Fusine.

Upon entering open ocean to the west of his new-found strait, Magellan, impressed by the waters' calmness, dubbed them "pacific." "It is indeed pacific," Pigafetta wrote, for "there were neither storms nor tempests." In 1540, eighteen years after the return of the *Victoria,* the name "Pacific" was christened on two printed maps from Sebastian Munster's rendering of Ptolemy's *Geographic* that of America (right half, Fig. 43), and of the world. This first use of the term was widely proliferated, being published four times through 1552, the same maps reaching a wider audience in another work of Minister, the *Cosmographia,* in editions from 1544 through 1578. His maps of America and Asia, when mated together, form a continuous map of the Pacific and were the first widely disseminated, detailed cartographic images of the ocean. They formed two of a set of four continent maps in the book, the first set of continent maps to be published.

Left. Fig. 42. Guam and Rota, Antonio Pigafetta, ca. 1525. When George Anson visited the Marianas more than two centuries later, his crew was impressed with the Chamorro vessels, which they called "flying proas" on account of their speed. [Beinecke Rare Book and Manuscript Library, Yale University] *Belour.* Fig. 43. Asia and America, Sebastian Minister, 1540. In the lower right we see the first appearance of the term "Pacific Ocean" on a printed map. A widening of the ocean is readily evident over earlier printed maps. This improvement, however, has not deterred him from persevering in the belief that the ancient seafarer Alexander had reached Peru, where we find *Cattigara* marked. An inscription associates South America with the lost continent of Atlantis. [Mappae Japoniae]



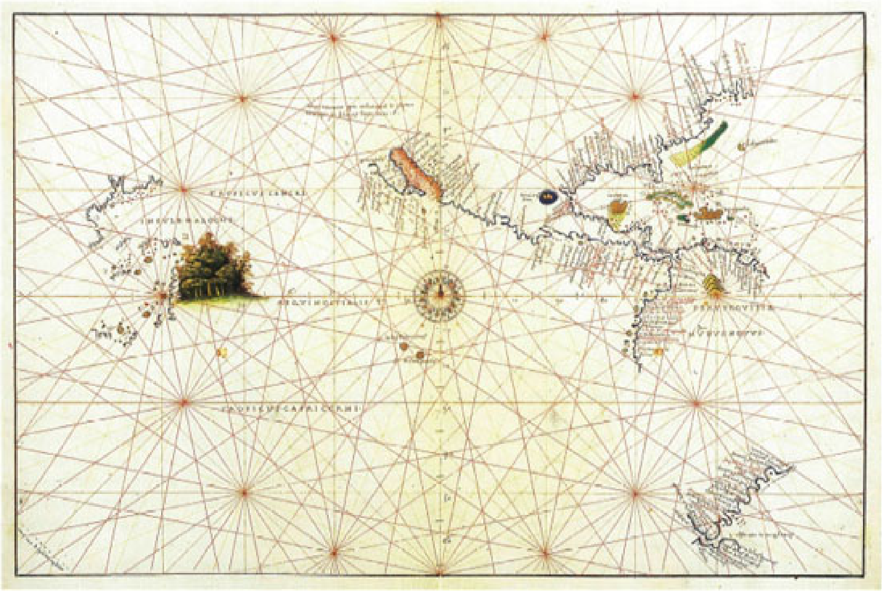


Fig. 44. Chart of the Pacific, Battista Agnese, ca. 1544. [Library of Congress]

All but one of the islands inhabiting Munster's Pacific come from Marco Polo and Magellan. Just below the galleon representing Magellan's *Victoria* lie two islands that Magellan passed on his odyssey across the Pacific in 1520 —the first of them perhaps Puka Puka, on the northeast of the Tuamotus. Munster's inexactness with these two islands, as well as with the Marianas still to come, suggests that he relied on secondary sources, as even the flawed printed account made plain that these two islands do not lie on the same latitude, as he has mapped them. The most likely source of the error is the *Decades* of Peter Martyr, which simplifies the account and reads as though the two islands formed a neighboring pair.

Since Pigafetta's description of them represents the first published description of any island of Oceania, the brief passage is worth quoting: "We saw but two uninhabited islands, where we saw no other things than birds, and trees, and for this reason we called them the Unfortunate Isles, and the distance between them is two hundred leagues. We found no anchorage there, and there were many fish called *tiberons* [sharks] there. The first island lies in 15° and the second in 9° of south latitude. Daily we sailed fifty, sixty, or seventy leagues. And if God had not given us fine weather, we would all have perished of hunger in this very vast sea. And we were certain that such a voyage would never be made again."

One of the islands became known as St. Petri, the other as Tuberones. These first two European discoveries in Oceania, though relatively minor, endured on maps for over 200 years, appearing on charts which discarded far more important data from subsequent Spanish voyages. They occasionally grew into major islands at the desks of some mapmakers, such as on Jodocus Hondius's map of America, 1606 (see Fig. 67).

Munster was not alone in supposing them to be neighboring isles. He may have been influenced by Gerard Mercator, who on his double-cordiform world map of 1538 had also placed them together, though further south, below the Tropic of Capricorn. Similar confusion afflicted Guam and Rota, which one would have thought a more straightforward matter. Mercator (1538) places Guam and Rota *(Latronu)* south of the Tropic of Capricorn, while two years later Munster maps them twice: on the north, they are on the America half as two islands just to the left of the galleon's mast, labeled *ins. pdonum;* while on the Asia map, they are placed to the south, as *Insulae pdonu.* Both terms were typical corruptions of *ladroni* ("thieves"), the appellation given the archipelago by Magellan because of the islanders' purported habit of stealing. And although Munster's cartography was often flippant, Gerard Mercator, even in his gravest errors, was painstakingly careful.

Medieval Lore Mixes with New Discoveries

Directly above Munster's depiction of Magellan's *Victoria,* we jump back about 230 years to two features derived from Marco Polo's account of his return from China to Europe in the 1290s. The large island named *Zipangri* is, of course, Japan. Less certain is the identity of the "archipelago of 7,448 islands" surrounding it, but these probably represent the Philippines and neighboring Indonesian islands. "According to the testimony of experienced pilots and seamen that sail upon [the China Sea] and are well acquainted with the truth," Marco Polo related based on what he learned in China, the China Sea "contains 7,448 islands, most of them inhabited." Munster also maps

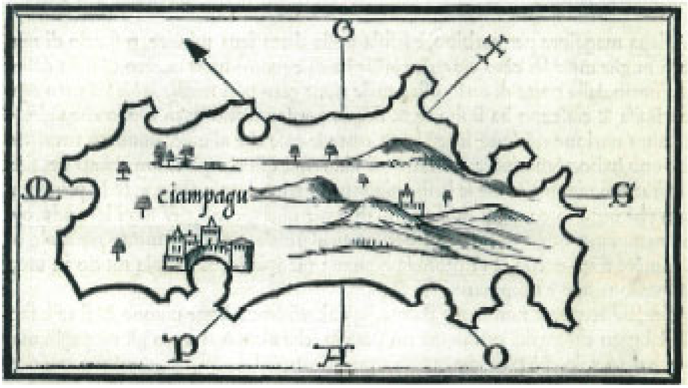
Palawan (Puloan) based on Magellan's voyage. Though placed in its approximately correct position, it lacks the island's long shape and diagonal orientation.

Calensuan, the single prominent island in the south Pacific (straddling the border of the America sheet), is Munster's only Pacific land not from Polo or Magellan. Indeed, it is not a Pacific island at all, but one of uncertain identity found in the Indian Ocean on maps dating from the latter part of the fifteenth century. Transplanting it to the Pacific was natural for Munster; his placement of Cattigara in Peru shows that he believed the Pacific to have been Ptolemy's "Great Gulf" of the Indian Ocean, and thus in his mind he was keeping Calensuan in the same place as his predecessors. That the name Calensuan is coincidentally similar to those of a couple of islands reported by the Magellan expedition in the southern Philippines, may have "confirmed" the placement.

In Munster's Southeast Asia, we find the islands of *Taprobana Sumatra* (the first term being a confusion with Ceylon), *lava minor* (a duplication of Sumatra or Borneo), *lava maior* (Java), *Pome* (Borneo), *Timor, Taranata* (Ternate in the Moluccas), *Gilolo* (Halmahera), and, as we saw earlier, *Puloan* (Palawan).

A more cautious rendering of the Pacific is seen in some portolan charts of the era, such as that by Battista Agnese, a Genoese chartmaker who worked in Venice (Fig. 44). No hypothetical Japan is shown, and the only islands in the mid-Pacific are the two passed by Magellan. Most conspicuous are the map's lavish vignette of a spice tree marking the Moluccas in the western Pacific, and the color red on the Gulf of California. Why red? When in 1539 Hernan Cortes sent Francisco de Ulloa to investigate Baja California ("Santa Cruz"), Ulloa, in his account of the expedition, commented that they named the gulf *Mar Bermejo* ("reddish sea") "because it is of that color." Sediment from the Colorado River produced the reddishness.

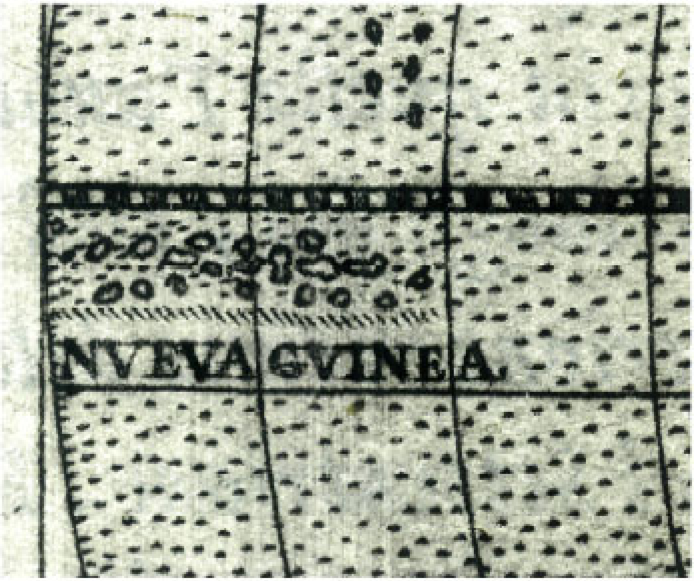
The first *printed* maps of individual Pacific islands (and thus the first to be seen by a wide audience) appeared in the *isolario,* or "island book," of Benedetto Bordone, 1528 (Fig. 45). In addition to maps of Sumatra and Java, Bordone included a conjectural map of Japan based on Marco Polo. Not until fourteen or fifteen years after the map was published was the first Portuguese blown off course to a chance landing on Japanese soil.

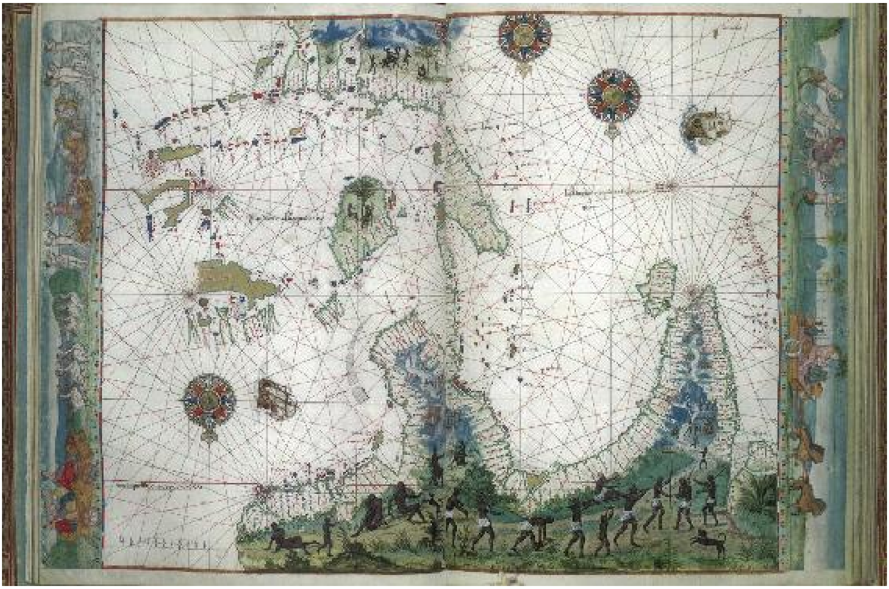


Above: Fig. 45. Japan, Bordone, 1528. Polo placed Japan "some 1,500 miles from the mainland," his "miles" probably referring to Chinese *li,* thus close to the true distance separating Japan from China. *Overleaf.* Fig. 47. Chart of the southwest Pacific from the Vallard atlas of ca. 1547. At the south (top) center is *la jave,* the northern part of enigmatic "Jave-la-Grande." Above the lower left rose compass are the Philippines, one marked as the island where Magellan was killed (Mactan). The easternmost major islands are Halmahera and Maluku. [Reproduced by permission of The Huntington Library, San Marino, California.]

In 1526, a Portuguese pilot, Jorge de Menzes, was blown past the Southeast Asian island of Halmahera and reached the northwest coast of an unknown landmass—the earliest known European landfall in New Guinea. Two years later, Alvaro de Saavedra came upon it while searching for a sea route east across the Pacific, and named the island Papuas. It received its modern name in 1542 when Ruy Lopez de Villalobos, also searching for an eastward route across the Pacific, dubbed it New Guinea because of the land's dark-skinned people. In the words of the English chronicler Richard Hakluyt, Villalobos "sent from the Island of Tidore [a] ship towards New Spain, by the south side of the line [equator] … they sailed to the coast of Os Papuas, and ranged all along the same, and because they knew not that Saavedra had been there before, they challenged the honor and fame of that discovery. And because the people there were black and had frizzled hair, they named it Nueva Guinea."

Fig. 46. Detail of New Guinea from the *Orbis Descriptio* of Ruscelli, 1561.

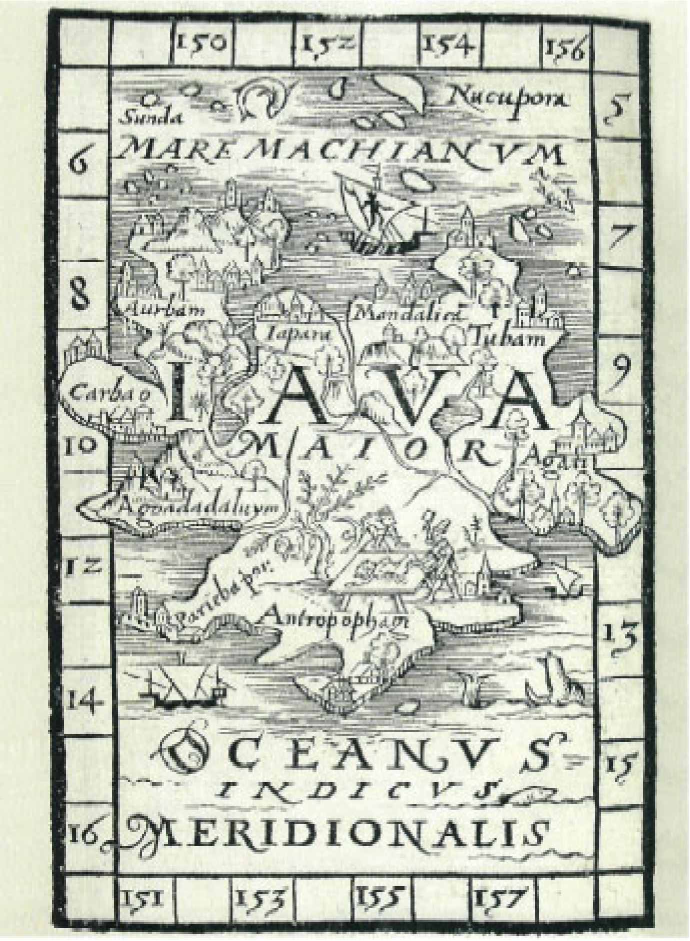




The first published map to record the discovery was the 1561 world map, *Orbis Descriptio,* of the Venetian mapmaker Girolamo Ruscelli, who depicts it as a series of small islands hovering above a vague east-west coast (Fig. 46). This pattern quickly vanished from view, even on late (1598-9) issues of the same map, where the copper was reworked to make New Guinea a single large island. But New Guinea was supposed by other geographers to be part of Terra Australis. The influential Ortelius was himself split on the matter, depicting it as an island on his world maps of 1570 (Fig. 63) and 1587, but as part of Terra Australis on his maps of America of the same years (1587, Fig.

57), in all four cases accompanied by an inscription explaining that its nature was not known.

New Pacific geographic data mixed with myth and medieval sources. The same year that Ruscelli first revealed New Guinea to purchasers of his atlas, the Basel publisher Petri issued a small woodcut map of Java (Fig. 48), the first separate map of the island after Bordone's archaic rendering of 1528. Whereas Ruscelli's New Guinea was a straightforward record of whatever data he could acquire, Petri's Java was nothing more than "modern" nomenclature imposed upon a fanciful configuration embellished with medieval toppings. The south of Java, which extends fully to 14° because the southern realm of the island was still unknown to Europeans, is inhabited by *anthropophagi,* eaters of human flesh. North of Java lies Nueupora, a throwback to Marco Polo's mention of the Nicobars, which indeed were often placed north of Java in the latter part of the fifteenth and early sixteenth centuries.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Sunda
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MARE MACHIANVM
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Carbao
IAVA
MAIOR
Agan
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Agondadalcym
12
garieba por
Antropophagi
13
14
OCEANVS
INDICVS
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MERIDIONALIS
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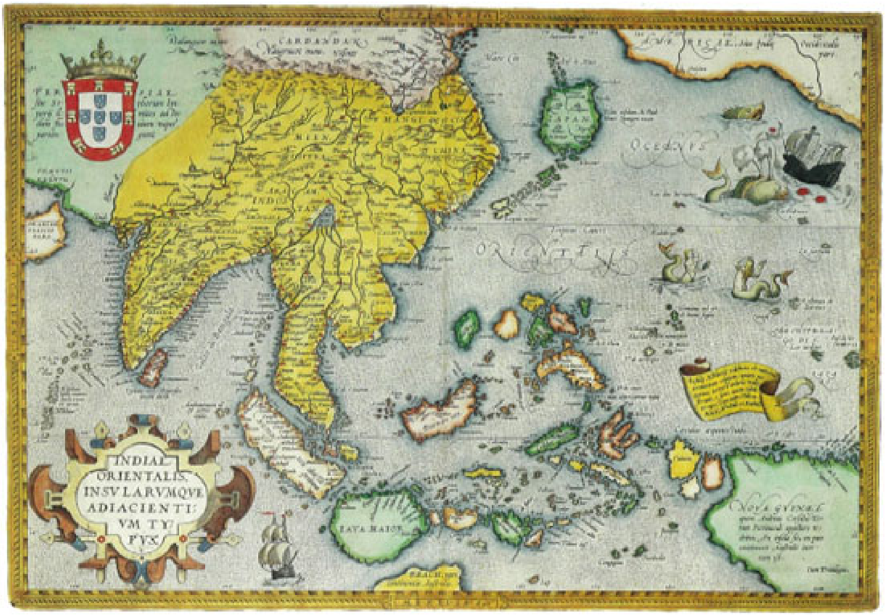
Above: Fig. 48. Woodcut map of Java. Henricum Petri, in Johann Honter's *Proli de Sphaera,*

1561. *Below.* Fig. 49. The western Pacific, Abraham Ortelius, 1570.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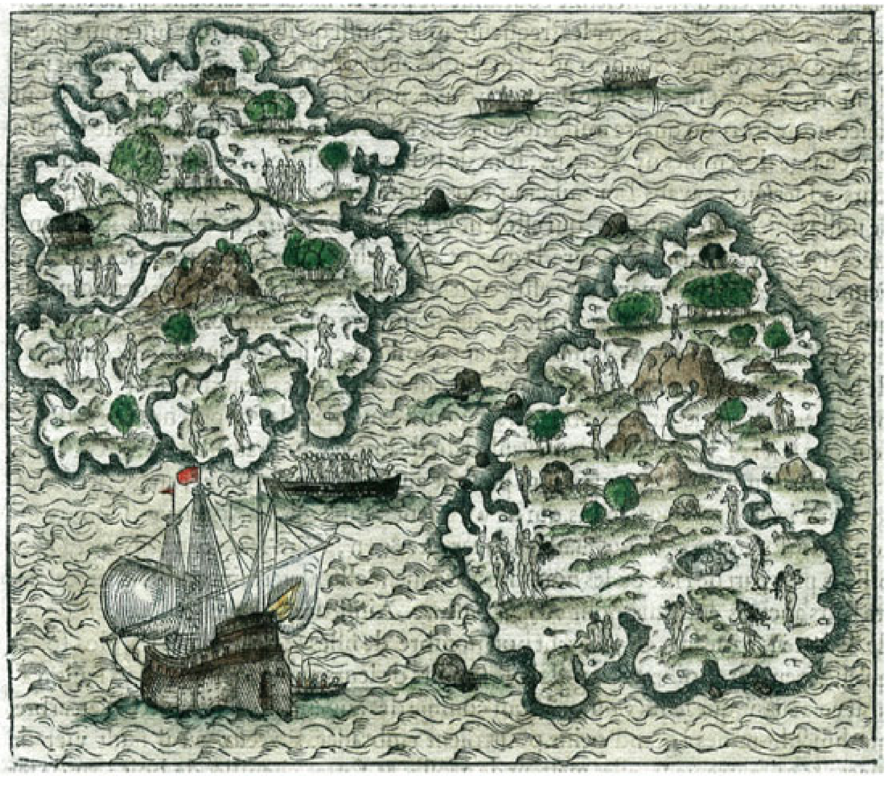


Fig. 50. The Pacific islands *of Inebila* (left), inhabited by men, and *Imangla* (right), inhabited by women, from the *Cosmographie Universelle* of Andre Thevet, 1575. *Inebila* comes from

the Arabic *nabilah,* meaning "beautiful." *Imangla* is believed to derive from the Sanskrit word *mangala,* meaning "fortunate."

Map publishing in the sixteenth century was a business as it is now, and consumer appeal was as important then as now. Abraham Ortelius discerned a market for a lavish, high-quality atlas composed of uniformly produced maps of the whole world, and masterfully tapped it. In 1570, while the adventurous but crude woodcuts concocted by Munster were still being published, Ortelius produced his famous atlas, *Theatrum.* Among its maps finely engraved on copper was one focusing on Southeast Asia and the western Pacific (Fig. 49). Geographically, the map was derived from the great world map of Gerard Mercator from the previous year, amended by Ortelius to remove certain controversial opinions of the elder geographer. Regarding Pacific shores, these were the theory that the Philippine island of Palawan was Ptolemy's island of *Bazacata,* and that the Canton River was actually the Ganges. Both these erroneous conclusions were reached in an attempt to correlate Ptolemaic data to the modern map.

Ortelius scatters Micronesia around images of two mermaids, each looking at herself in a mirror. Such images are normally gratuitous decorations of no contextual or intellectual value. However, in this instance the two narcissistic sprites probably reflect one of several traditions of an "island of women" somewhere in the seas off Asia, perhaps a Chinese version in which the women conceive by looking at their own reflected image, as Ortelius depicts.

The French geographer Andre Thevet drew a separate map of the male and female Pacific islands for his *Cosmographie Universelle* of 1575 (Fig. 50). The island on the upper left is inhabited solely by men, that in the lower right, only by women. Although not named on the map itself, Thevet's text identifies these as *imangla* (female) and *inebila* (male), which various medieval sources record somewhere in Asian or Pacific waters. They appear at the western, "Pacific" threshold of the ocean sea on such *mappaemundi* as the Sanudo-Vesconte map of ca. 1320.

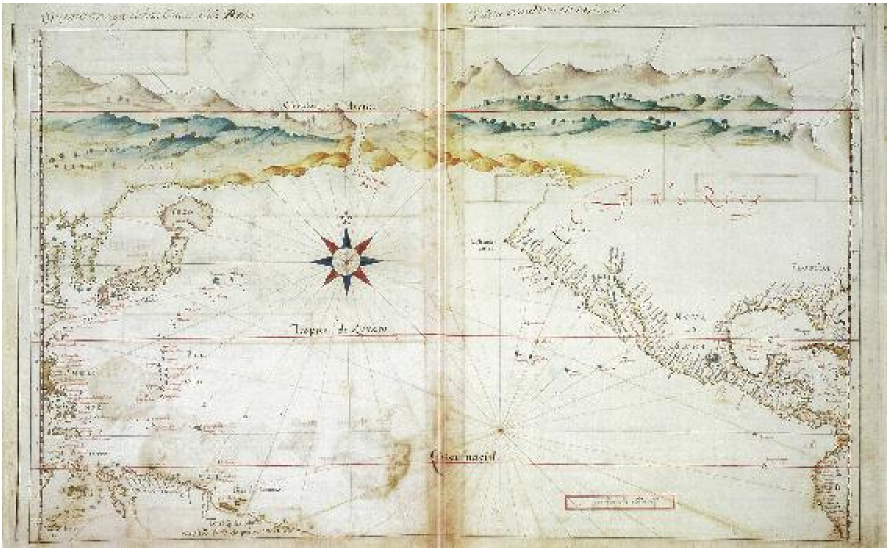


Fig. 51. Chart of the North Pacific, Joao Teixeira, 1630. The Solomons are shown hugging the New Guinea coast, and a few scattered islands from the Spanish explorations of the mid-sixteenth century appear south of the Marianas, where Saipan is mistakenly shown as the southernmost member. Several Pacific islands lie to the southwest of California, sighted by the Villalobos expedition in 1542. Teixeira correctly depicts Hokkaido *(Yezo)* as an island in remarkable accuracy, though this would not last, as the island would soon be assimilated into the unknown expanses of a vast coast. Hovering below Hokkaido is a vast tract of land spanning the north Pacific, broken only by the theoretical strait dubbed "Anian" by Gastaldi. Another Teixeira-type chart, dating from about two years later (Fig. 93), revises the land forming the northern perimeter of the Pacific, adds another northern passage, and scatters various Spanish sightings about the waters of Oceania. [Library of Congress]

NOVA ET ACVRATA TOTIVS AMERICÆ TABVLA. auG. I
AMERICA SEPTENTRIONALIS
MAR DEL NORTE
MAR DEL ZUR

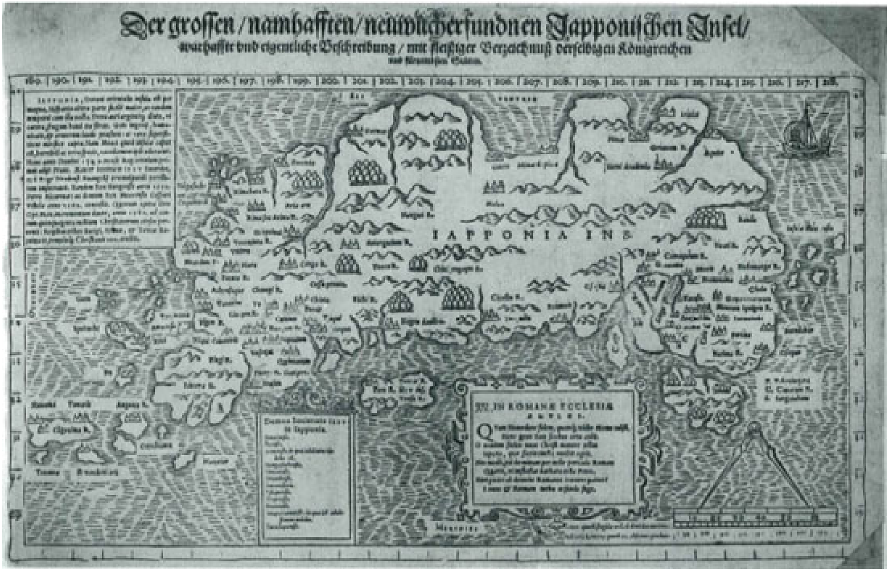
Fig. 52. Wall map of America, Willem Blaeu, ca. 1608 (Pietro Todeschi, ca. 1673). The Pacific, otherwise empty, serves as a canvas for embellishment. [Sidney R. Knafel]

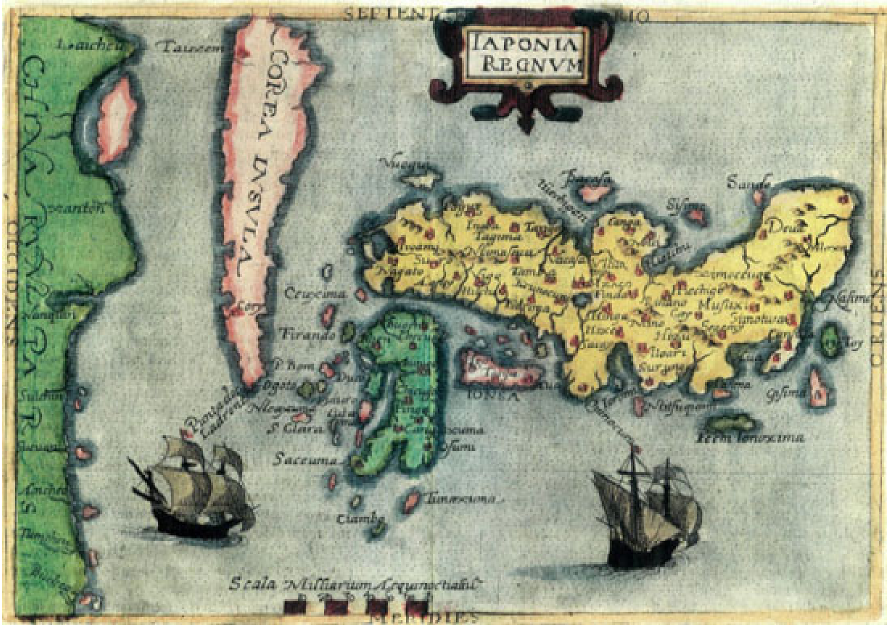
Both Marco Polo and Nicolo de' Conti mentioned the islands. Every March, according to Polo, the inhabitants of the male island sail to the island of women, where they remain for three months. Diverse traditions generally envisioned such isles as lying in the western Pacific. Pigafetta wrote that an "old pilot of the Moluccas" told him about an "island where there are only women, who conceive by the wind, and if there is a male, they kill him." Malay tradition identifies the island of Engano, south of Sumatra, as an island inhabited solely by the fair sex. The Trobriand Islanders also had their own "island of women" in their repertoire of distant shores, said to be a very dangerous land. In 1561, Gastaldi labeled one of the Philippine islands (probably Samar or Letye) as y *delle done,* the "island of women." The myth of such an island in the Pacific continued well into the eighteenth century.

In the eastern Pacific, two important archipelagos found their way from official portolan charts to the published arena during the last third of the century: the Galapagos and Juan Fernandez. Discovered in 1535 by Fray Tomas de Berlanga, Bishop of Panama, the Galapagos's earliest Spanish visitors saw less value in them than did pirates, who exploited their position as a base from which to attack Spanish vessels plying between Peru and Mexico. The archipelago reached the attention of mainstream mapmakers after they appeared on the large 1569 world map of Mercator, and more influentially the following year on the maps of the world and America in Ortelius's *Theatrum* (world, Fig. 63).

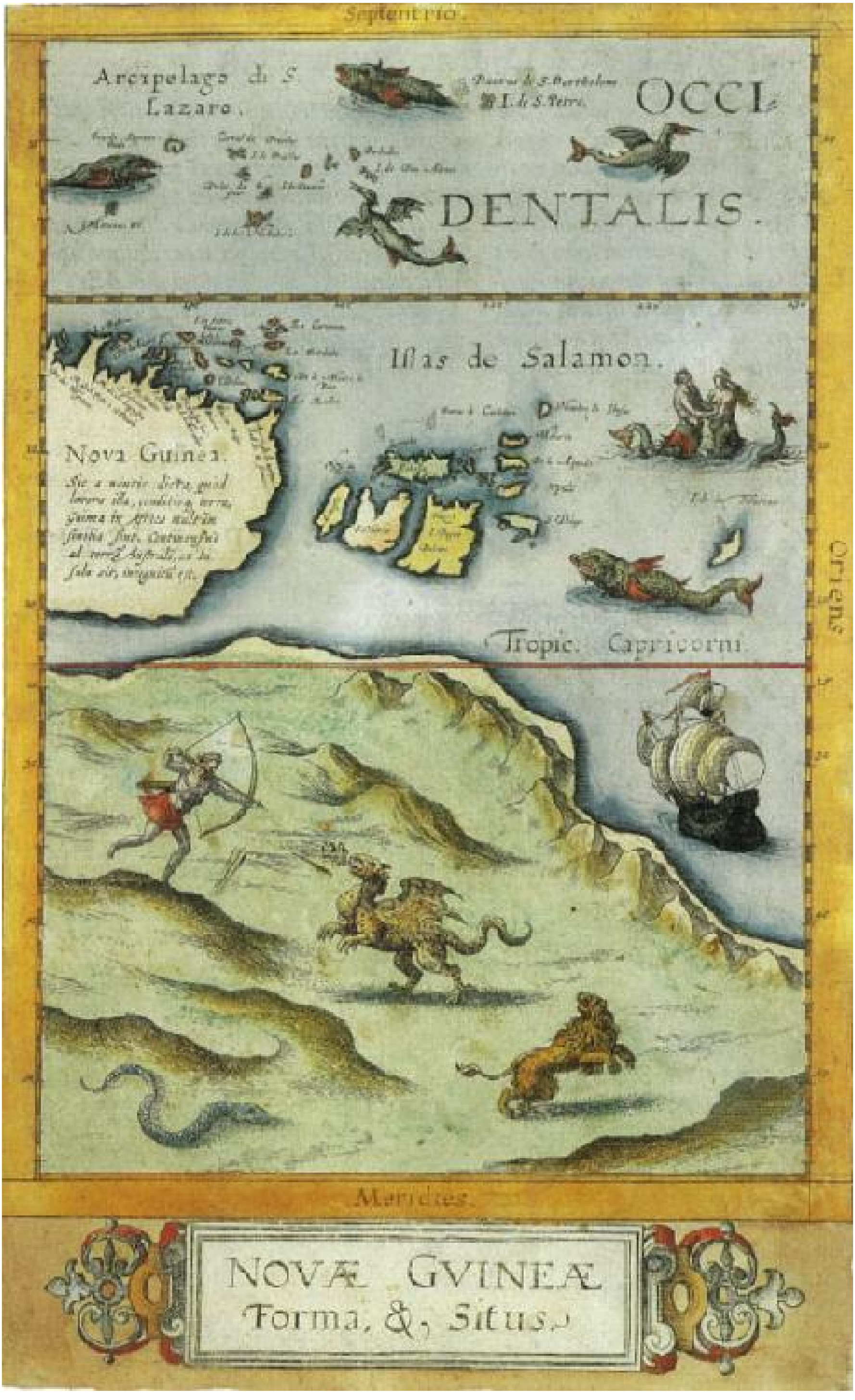
Meanwhile, the most conspicuous development off Asia's Pacific shores during this time was Japan. *Cimpangu,* the island reported by Marco Polo which helped lure Europeans into eastern seas, now joined the ranks of Western empirical mapping. Whereas in 1540 Munster (Fig. 43) had to rely exclusively on hypothetical medieval representations, fourteen years later Ramusio (Fig. 174) is able to vastly improve his *Cympagus* size and location, its southern shore being placed at 25° north, only about six degrees south of the actual southern coast of Kyushu. This reflects intercourse between Portuguese and Japanese merchants in southern Chinese and Southeast Asian ports. Two years later, in 1556, Ramusio would introduce to printed maps the modern name for Japan on his map of the Western Hemisphere, as *Giapam.*

The first map of Japan based on actual observation was a 1586 woodcut by Renward Cysat, who consulted both published and unpublished Jesuit accounts. This was followed nine years later by the copperplate map of Abraham Ortelius, based on information from the Portuguese Jesuit Luis Teixeira and derived both from Jesuit sources and from *Gyogi* maps (see derivative in Fig. 54).


Der groſſen/namhafften/neuwlicherfundnen Japponiſchen Inſel/
warhaffte vnd eigentliche Beſchreibung / mit fleiſſiger Verzeichnuß derſelbigen Königreichen
IAPPONIA INS


SEPTENTRIO
IAPONIA REGNVM
COREA INSVLA
CHINA PARS
OCCIDENS
ORIENS
Firando
S. Clara
Saceuma
Tanaxima
Scala Milliarium Aequinoctialium
MERIDIES

Above: Fig. 53. Woodcut map of Japan, Renward Cysat, 1586. Whereas the Bordone map (Fig. 45) is the first separate European map of Japan, Cysat's is the first to be based on actual geographic data. [Mappae Japoniae] *Below:* Fig. 54. Japan, Metellus, 1596. Based on the Teixeira prototype of Japan, as published by Ortelius in 1595.


Septentrio.
Arcipelago di S. Lazaro.
OCCIDENTALIS.
I. di S. Petro.
Iſlas de Salamon.
Nova Guinea.
Sic a nautis dicta, quod littora illa, conditioq. terræ, Guineæ in Africa multũ similia sint. Continens ne sit an terræ Australi, an insula sit, incognitũ est.
Tropic. Capricorni
Oriens
Meridies.
NOVÆ GVINEÆ
Forma, & Situs.

Chapter 4

In the Wake of the Solomon Islands

The Solomon Islands form a queer saga in Pacific cartography. Discovered in the course of a 1567-8 voyage from Peru by Alvaro de Mendana y Neyra, they were entwined with the search for a southern continent and forcibly endowed with qualities befitting their name, a name that was selected for them before their discovery. They were then "lost," and for two centuries were sought by numerous navigators, plotted in widely disparate meridians, and argued over by theorists. Yet, when they were finally rediscovered in the eighteenth century, the explorers who did so did not recognize them as being Mendana's lost isles until French geographers solved the puzzle and further expeditions confirmed the identity.

In the sixteenth century, places mentioned in the Judeo-Christian Bible were frequently still viewed as actual earthly locales. Most influential of these were passages about Ophir, the fabled land of riches and the place from which King Solomon was believed to have acquired his treasure. Early writers generally thought Ophir to lay in Africa or Southeast Asia, but by the sixteenth century, the Pacific became the preferred stage in the minds of some Spanish pilots and cosmographers. In the 1520s, Rodrigo de Santa Ella, founder of the University of Seville, wrote that Ophir lay in the middle of the Pacific. Seafarers followed the lead: it was sought by Sebastian Cabot in his aborted attempt to reach the Moluccas in 1526, as well as by Villalobos when he crossed from Mexico to the Philippines in 1542.

The Solomons on Printed Maps

Ophir figured not only into European attraction to the Pacific, but also its geographic theory. The Treaty of Tordesillas of 1494 had established a Line of Demarcation to divide the undiscovered, non-Christian world between Spain and Portugal. This theoretical Line ran 370 leagues (approximately 1770 kilometers) west of the Cape Verde Islands, and continued around the earth through the Pacific. Another 250 years would pass before longitude could be determined with accuracy, however, and in the interim the Line was pushed eastward by the Portuguese and shoved westward by the Spanish. Each used any available argument where science was wanting—and for the Spanish, the Bible's account of Ophir served as evidence. When representatives of Spain and Portugal met in Badajoz in 1524 to discuss these Pacific conflicts, the Spanish used the length of time Solomon's ships took to reach Ophir—three years—as proof that it lay so far to the east as to clearly be within the Spanish realm no matter how one determined longitude.

Amerindian reports gleaned by the Spanish in Peru fit the puzzle of

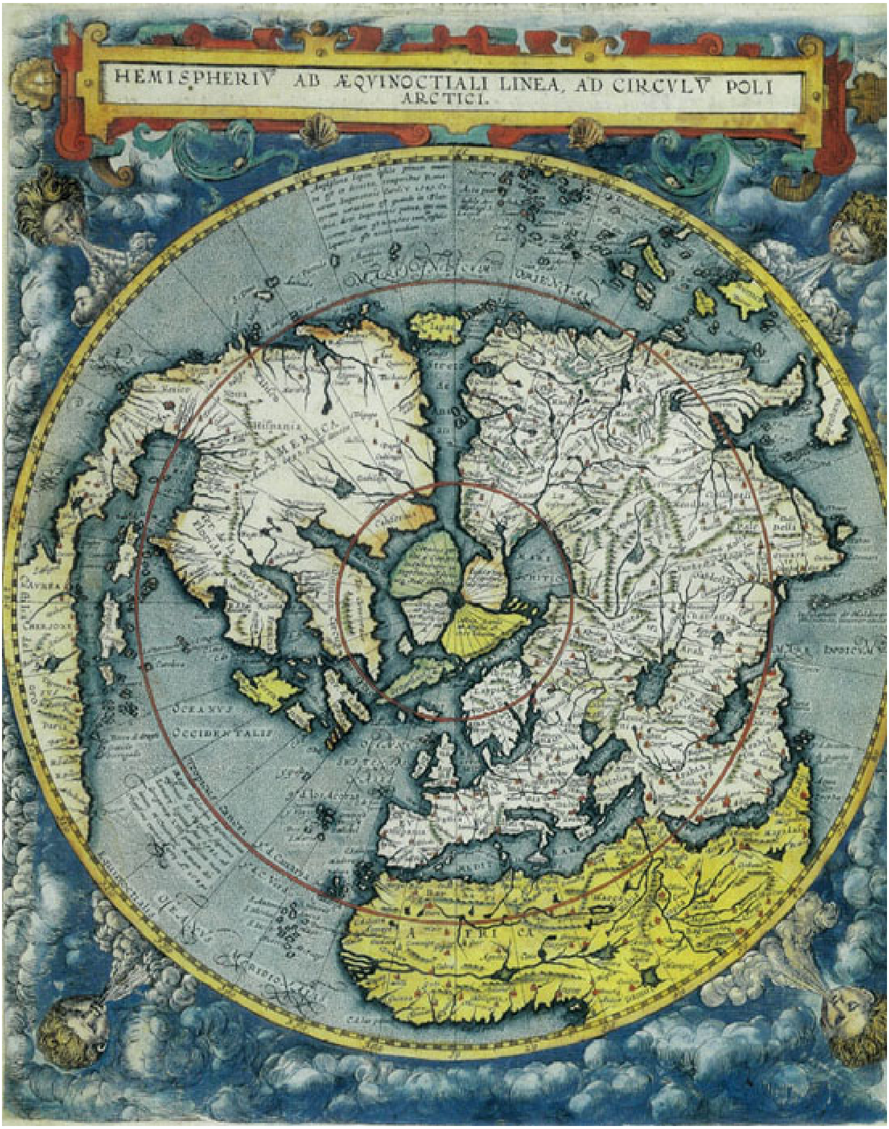
Ophir perfectly, "confirming" that a land of riches lay in the Pacific. Pedro Sarmiento, later to become a member of the Mendana expedition, met one Tupac Inca Yupanqui, who claimed to have encountered along the Peruvian coast merchants who had sailed into the Pacific on balsa craft. According to Sarmiento, Tupac Inca met "some merchants who had come by sea from the west, navigating in balsas with sails. They gave information of the land whence they came, which consisted of some islands called Avachumbi and Ninachumbi, where there were many people and much gold." Gold, to Sarmiento, suggested Ophir.

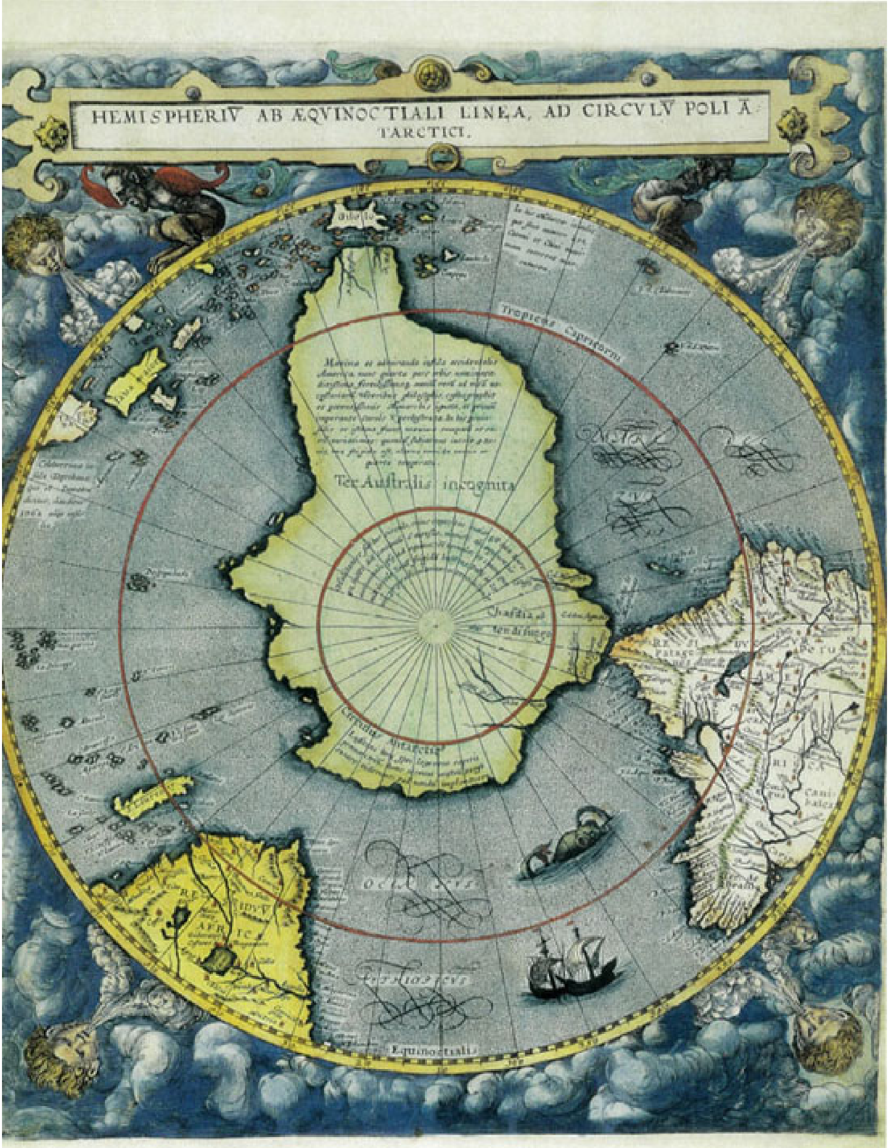
Tupac Inca, however, "did not lightly believe the navigating merchants," so he consulted a man who was "a great necromancer and could even fly through the air." The medium not only confirmed the truth of the merchants' story by divination, but also used his magic arts to go to the place himself. He "traversed the route, saw the islands, their people and riches, and, returning, gave certain information of all to Tupac Inca." Tupac Inca's invoking of the supernatural to confirm the truth of the Pacific land found a willing subject in Sarmiento, who himself was so intrigued by the mystical that he was held in suspicion by the Inquisition.

Tupac Inca then "caused an immense number of balsas to be constructed, in which he embarked more than 20,000 chosen men." He navigated and sailed on until he discovered the islands of Avachumbi and Ninachumbi, and returned. The length of Tupac Inca's Pacific voyage was said to be nine months to a year.

Thus, the locales assigned by Amerindian and Biblical reports of riches converged in south-central Pacific. Such was the romance and expectations that in a letter of 1565 to the king of Spain, two years before Mendana even left port, the governor of Peru already referred to the land his proposed voyage would find as "some islands, called Solomon, which lie over opposite Chile, toward the Spice Islands." This heightened anticipation and even influenced printed maps. Gerard Mercator, on his 1569 world map, places an archipelago roughly 10° west of Peru which he states is said to be gold-bearing but as yet undiscovered. Ortelius then included them the following year on his maps of America and the world (Fig. 63), the legend abbreviated.

Opposite: Fig. 55. New Guinea and the Solomon Islands, Cornelis de Jode, 1593. The island at right center, I. *de los Tiburones,* is one of the pair of "unfortunate islands" Magellan passed en route across the Pacific, named by mapmakers for the "many fish called tiburons there" (see page 50). *Overleaf.* Fig. 56. Map of the world on a double polar projection, Cornelis de Jode, 1593. In the southern (right) hemisphere, New Guinea (11:30) is deemed a part of Terra Australis. The two Pacific islands at about 1:00 are Magellan's "Unfortunate," placed according to Pigafetta's text. Note the narrow strait between North America and Asia, with Japan squeezed between them (left hemisphere, 12:00). [William Ginsberg]


HEMISPHERIV AB ÆQVINOCTIALI LINEA, AD CIRCVLV POLI ARCTICI.
AMERICA
OCEANVS OCCIDENTALIS
AFRICA


HEMISPHERIV AB ÆQVINOCTIALI LINEA, AD CIRCVLV POLI Ā TARCTICI.
Tropicus Capricorni
Ter Australis incognita
Circulus Antarcticus
Equinoctialis
AFRICA
PERV
Brasil

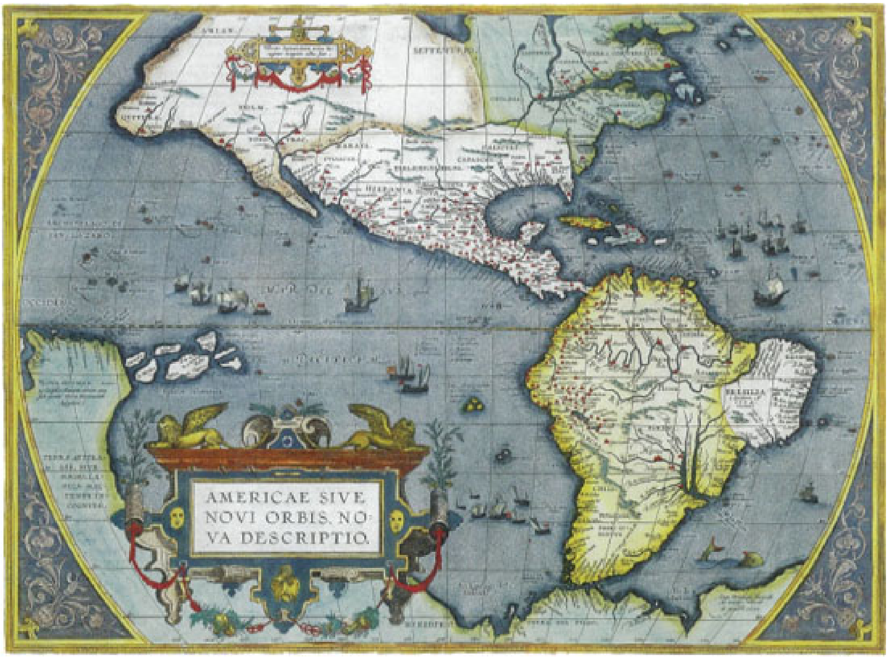


Fig. 57. America, Abraham Ortelius, 1587. A major consideration that led Ortelius to revise his maps of America and the world in 1587 was the discovery of islands to which the name Solomon had been given. With Ortelius's revision, the discovery of the islands—and with it the two-century search to find them again—first appeared on printed maps. That islands befitting the term were sought before their discovery is also reflected by Ortelius: off the Peruvian coast are "undiscovered gold islands," a vestige of the very reports that had led Mendafia to undertake his voyage. Juan Fernandez also makes its printed debut on this map, as *Felix* and *Nabor.* [Martayan Lan, NY]

There is no indication that the expedition itself ever endowed its discovery with the name of the ancient king of Israel, but that appellation was instinctively attached by those who related news of the voyage. When the Solomon Islands were plotted on manuscript maps—a notable early appearance being the Lopez de Velasco chart of 1575—they were already designated as such.

Abraham Ortelius introduced the "real" Solomons to printed maps on his 1587 revisions of his maps of America (Fig. 57) and the world, and two years later gave a different rendering of them on his *Maris Pacifici,* the first printed map specifically devoted to the Pacific Ocean as a whole (Fig. 58). The 1587 maps retain as well the "undiscovered gold islands" off the Peruvian coast of the earlier Mercator and Ortelius maps, but these are wiped away in the *Maris Pacifici.* In 1593, the Solomons featured prominently on a map of New Guinea by Ortelius's less successful business rival, Cornelis de Jode (Fig. 55), as they did on a map from Barent Langenes' miniature atlas five years later (Fig. 59).

These early Pacific maps derived their data principally from two Spanish endeavors: the search for westerly winds for a viable route eastward across the

Pacific back to the Americas, and the search for a gold-rich austral continent. Most of the smaller islands in the open Pacific are uncertain members of the Micronesian archipelagos, and are discussed in Chapter 9.

Before the *Maris Pacifici,* Ortelius had hedged his bets regarding New Guineas insularity. On his two principal geographic models, those of 1570 and 1587, he had depicted New Guinea as an island on the world (1570, Fig. 63) and as part of Terra Australis on the America (1587, Fig. 57), in both cases qualifying the delineation with an inscription stating that the nature of New Guinea was not known. But the *Maris Pacifici* delineates New Guinea as an island in a new configuration, and without the disclaimer, despite focusing on the region more closely than his previous maps.

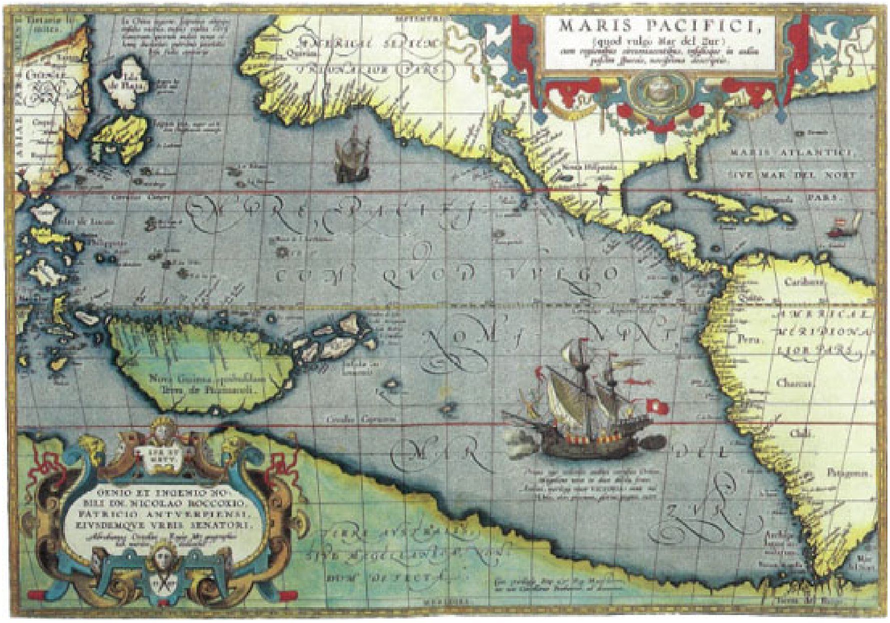

MARIS PACIFICI,
(quod vulgo Mar del Zur)
MARIS ATLANTICI SIVE MAR DEL NORT PARS.
AMERICAE MERIDIONALIOR PARS.
Peru
Charcas
Chili
Patagones
Nova Guinea
MAR DEL ZVR
TERRA AUSTRALIS SIVE MAGELLANICA NONDUM DETECTA.
Isla de Ladrones
Nova Hispania
Caribana
Terra del Fuego

Fig. 58. Pacific Ocean, Abraham Ortelius, 1589. Dated (and presumably engraved in) 1589, this first printed map specifically devoted to the Pacific Ocean was first published in 1590. Only two years separated this from Ortelius's revision of his map of America (Fig. 57), which included most of the Pacific because the west coast of New Guinea and the Strait of Anian were placed on the same longitude. Yet Ortelius now delineates New Guinea in a new fashion, omits Juan Fernandez, reworks the Spanish discoveries in Micronesia, and draws heavily from Spanish incursions north along the California coast to give new form to the American Northwest. Unlike Ortelius's map of America, however, the *Maris Pacificisms* not widely copied, a 1598 map by Metellus being the only unaltered published imitation.

As before, Ortelius identifies New Guinea as the *Piccinacoli* of Andrea Corsali, a merchant explorer in the employ of the Medici who had traveled with a Portuguese vessel to the Indian Ocean. "In the east," Corsali wrote in a letter published by G. B. Ramusio in the first volume of his *Navigationi et Viaggi* (1550), "are the islands where cloves grow, called the Molucca Islands, and where nutmegs and macis are found: in another lignum aloe, in still another sandal wood. And navigating to the east they say that there is the land of Piccinnacoli. This land, in the opinion of many, joins on the east and south the land of Brasil or verzino." Corsali's reference to "east and south" reveals that he understood "Brasil" not as a region of South America, but rather as a region of Terra Australis, to which the term had been transferred by such geographers as Schoner (Fig. 26) and Fine (Fig. 33) as a result of a confusingly worded report entitled *Newe Zeytung auss Presillg Landt* in a 1514 German newsletter, detailing an otherwise unknown voyage.

Sailing from Callao on November 19, 1567, with two vessels, Mendana sailed west and slightly south until reaching about 15i/2°, at which latitude the course was set due west. A month after their departure, no land having been found, chief pilot Hernan Gallego steered them slightly to the north, not leveling their course until they had reached 6° 15'. In mid-January, an island was sighted to which they gave the name *Ysla de Jesus.* Both Ortelius (in the *Maris Pacific!*) and de Jode (Fig. 55) map this island in the northeast corner of the archipelago. Various identifications have been proposed for this island. A likely answer is that it is one of the Tuvalu group, roughly midway between Fiji and Kiribati. According to Gallego, they were 1471 leagues from Peru, a marked underestimate. Although winds and currents prevented any landing, some contact was made with the Melanesian or Polynesian islanders. The original Melanesian inhabitants were at this time being superceded by people from Samoa.

Continuing west, a series of shoals and low islands were found which, it being the Eve of the Candlemas, were named *Los Bajos de la Candelaria.* These, recorded by de Jode, are perhaps Roncador Reef or Ontong Java, which lie just north of the Solomons. Difficult weather now ensnared their progress, some days being wasted under bare poles, but on February 7, 1568, a large landmass was sighted which is still known by the name they christened it—*Santa Ysabel,* prominent on our three maps (Figs. 55, 58, and 59). The expedition landed on the island, took possession of it in their king's name, and set about building a brigantine for local exploration.

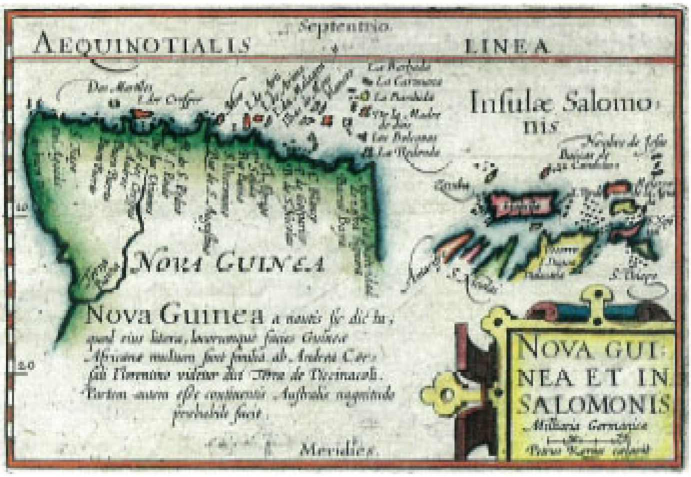


Fig. 59. New Guinea and the Solomon Islands, Barent Langenes, 1598.

The small vessel set out on April 7 with pilot Gallego among its crew. Sailing eastward along the coast, a new island came into view which, as Gallego related, "appeared to be very fertile," and so was given the name Buena Vista. Ortelius and Langenes record it thus, while de Jode marks it as I. Verdes (green islands). This was Nggela Sule or another of the Florida Islands.

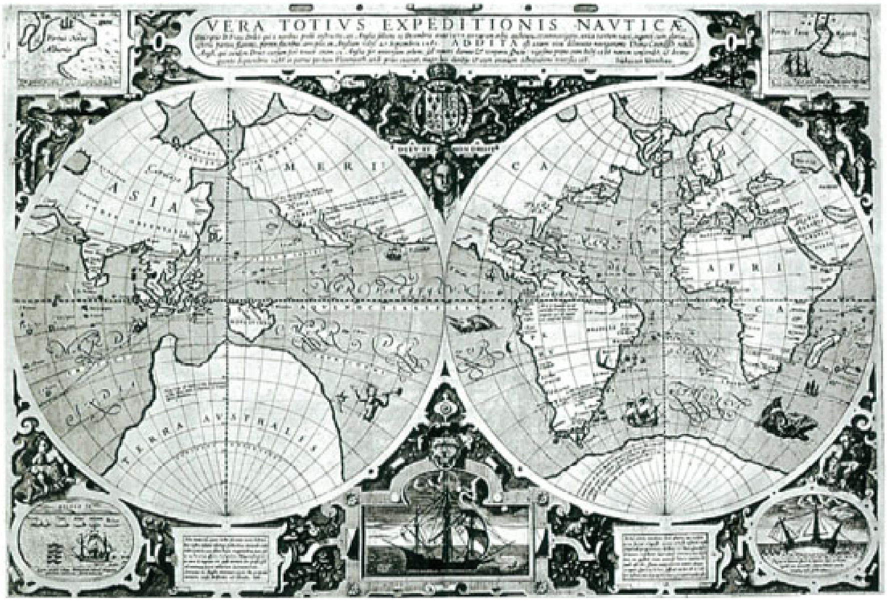
New shores were then sighted which the islanders, and in turn the Spanish, called *Malaita,* mapped as a large island by Ortelius and as a smaller one by de Jode. Ortelius also marks *P. Escondido* ("hidden point"), because there a good harbor's spaciousness was at first concealed by its narrow mouth. Two other islands during their reconnaissance were given the names *San Nicolds* and *Ysla de Arracifes,* though the presence of reefs and shoals deterred them from any attempt at landing. Both Ortelius and de Jode corrupt *Arracifes* to *Amacifre,* suggesting that there was at least one piece of source material common to them.

Landing on another island, Gallego encountered natives who seemed very friendly, but who then suddenly attacked them. Since "they attacked us after a broken truce," the company named the place *La Treguada* ("Truce Island"). Ortelius labels this island *Isola Atreguada,* while de Jode, extracting the name from a secondary source without knowing the event, supposes it to have been intended as "aguada," meaning a place were water is obtained. Next, a trio of shoal-girt islands was encountered and given the name Las Tres Marias, recorded simply as Las Marias by Ortelius. A narrow, mountainous island with many people was dubbed Ysla de Santiago-, de Jode marks it S Thiago, while Ortelius uses S. Anna. Both depict it as the most easterly of the archipelago.

The brigantine now returned to *Santa Ysabel and* the full crew while de Jode marks it as *I. Verdes* (green islands). This was Nggela set off on the main vessel. Uncooperative winds stifled their efforts Sule or another of the Florida

Islands. to retrace some of the brigantine's discoveries, and instead they found themselves coasting an island not sighted earlier, *San Cristoval* (de Jode's *S Xpovat).* This may have been the southern coast of Santiago. Approaching two low, flat islands with reefs, they were met by twelve islanders in a canoe from whom they tried to determine the direction of any major landmass. The islands were named *Santa Catalina* and *Santa Ana,* both shown by Ortelius.

Fig. 60. World map recording the voyages of Francis Drake and Thomas Cavendish, Jodocus Hondius, ca. 1595.


VERA TOTIVS EXPEDITIONIS NAVTICÆ
ADDITA
ASIA
AMERI
CA
AFRI
CA
TERRA AVSTRALIS

INSULÆ Indiæ Orientalis PRÆCIPUÆ
INSULÆ PHILIP PINÆ
ARCHIPELAGUS S. LAZARI
ISLAS DE LOS REYES
INSULA BORNEO
NOVA GVINEA

Fig. 61. The southwest Pacific, Jodocus Hondius, 1606.

Beset by hardships, the expedition headed home, reaching California in December 1568 and Callao in September the following year. Although the distance Mendana sailed from America was severely underestimated, maps of the period generally placed the Solomons correctly in relation to New Guinea. This relative accuracy resulted from the prevailing underestimate of the size of the ocean itself, and with it the distance of New Guinea from Peru.

However, as maps increased the breadth of the ocean, the Solomons became further removed from New Guinea. Failure to find the Solomons again led to expedient placement of the archipelago, and by the end of the seventeenth century some geographers displaced them yet further to the east. While, in 1679, du Val (Fig. 89) still locates them close to New Guinea, they appear south of California on the 1713 map of de Fer (Fig. 97) and, copying him, on the 1719 map of Chatelain and on the map of de Leth of ca. 1740 (Fig. 65).

Francis Drake's Circumnavigation

When Sir Francis Drake circumnavigated the world in 1577-80, he made no discoveries or landfalls until a single stop in western Micronesia, and thus had no direct impact on the mapping of Oceania. His greatest influence was in placing his kingdoms footprint on the western shores of North America, in expediting Dutch mastery of the ocean by seeding the belief that Tierra del Fuego was insular (see page 86 below), and in stealing confidential Spanish charts, some of whose data was probably tapped by such mapmakers as Jodocus Hondius (Figs. 60 and 61 above), Edward Wright, and Gabriel Tatton (Fig. 64).

While sailing up the western coast of South America, four months before heading into the open waters of the Pacific, Drake pirated a small Spanish vessel which was en route to Panama. To his fortune, one of the pilots on board was Alonso Sanchez Colchero, who was on his way to meet the new governor of the Philippines and to escort him across the Pacific to his new post. Drake confiscated Colchero's charts and sailing directions, and then through bribes and threats tried to coerce him into escorting the *Golden Hind*across the Pacific. Colchero was, however, strong-willed, and refused to yield. Thus, when Drake opened his sails from New Albion (North America) on the first English Pacific crossing, it was with the benefit of Spanish charts and sailing directions, but without the benefit of a Spanish navigator.

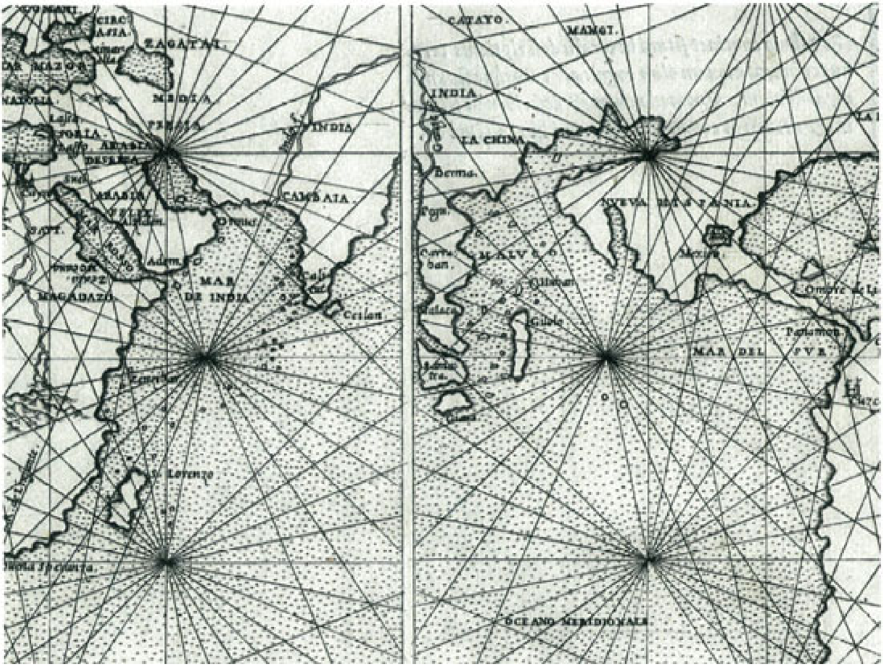


Fig. 62. Giacomo Gastaldi, 1548 (Girolamo Ruscelli, 1561). In this image, the map's the right and left ends have been joined to show the full ocean between Africa and America, which is depicted as an expanded Indian Ocean. Revealingly, Oceano Meridionale ("Southern Ocean"), which traditionally denoted the Indian Ocean, is marked in the seas off South America, and Mar del Sur, Balboa's term for the ocean he saw after crossing Central America, specifically marks only those waters. Halmahera (Gilolo) is the single prominent Pacific island, its longitude midway between Malaya and California, and due north of California is the Chinese province of Mangi (Manzi).

Drake's first landfall in the Pacific was what he dubbed the "Island of Thieves"—the same appellation given by Magellan to his first Pacific stop. This characterization, however, has no value in determining the identity of this island, as thievery, or at least what to European sensibilities was thievery, was a widespread trait among Pacific Islanders, who did not have the same precepts about private property as their visitors; it is difficult to find an account of a European voyage to Oceania which does not complain about this. It is even possible that Drake's "Island of Thieves" was a fabrication, a deliberate imitation of Magellan's *Ladrones,* intended to establish English precedent and sovereignty over Magellan's or some future landfall. Neither of the two world maps created shortly after Drake's return, one by Nicolas van Sype (1583) and the other by Jodocus Hondius (ca. 1595, Fig. 60), show the island, and his descriptions of the "Island of Thieves" contain ethnographic inconsistencies. These problems aside, the island may have been Palau or Yap. From Micronesia, Drake enriched himself in the markets of the Moluccas, and was nearly shipwrecked off eastern Halmahera before reaching open seas to the south. En route home, he became the first European known to reach the southern shore of Java.

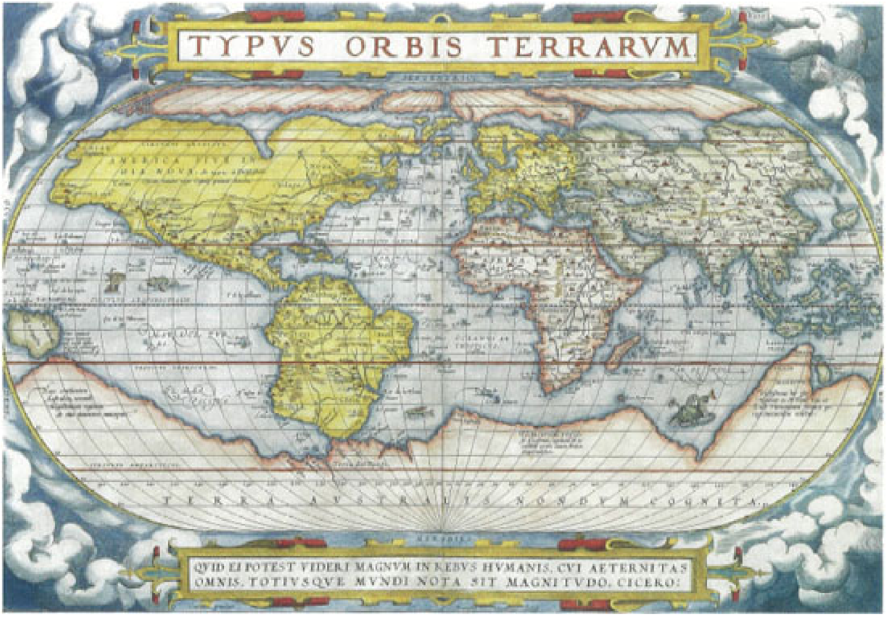

TYPVS ORBIS TERRARVM
TERRA AVSTRALIS NONDVM COGNITA
QVID EI POTEST VIDERI MAGNVM IN REBVS HVMANIS, CVI AETERNITAS OMNIS, TOTIVSQVE MVNDI NOTA SIT MAGNITVDO. CICERO:

Fig. 63. World map, Abraham Ortelius, 1570. This was the first widely disseminated map to record the Galapagos Islands. [Martayan Lan, NY]

Drake's landfall on *Nova Albion* on the west coast of North America quickly became a standard feature on published maps, but his influence on the mapping of the ocean was subtle. Some delayed improvement in the mapping of Halmahera might be attributed to his report that the island's eastern coast was wildly irregular. His influence on the mapping of Java was perplexingly scant. Although his landfall on its southern coast should have immediately corrected the medieval error of extending the island much too far south, in reality it had no geographic impact even on the few maps that acknowledge his presence there. Many details of his voyage remain today a topic of emotional controversy.

That the Spanish charts stolen by Drake had some subtle influence on mapmakers in England can be discerned on the map of the Pacific by Gabriel Tatton, a hydrographer of the Thames school of chartmakers (Fig. 64). Published in about 1600 as a loose-sheet map, never part of a formal atlas, Tatton's recording of *Nova Albion,* Drake's enigmatic encounter with the west coast of North America, is the only clear mark of Drake himself. However, new data found in the northern Pacific likely comes from Drake's Spanish charts. We can see this even along the New Albion coast, where Tatton's map places an inscription in Spanish—Tatton would have composed his own in Latin.

The Marianas are much improved over the Ortelius *Maris Pacifici,* now boasting twelve named members correctly aligned north-south. One of interest is *Buena Vista* ("good view"), directly north of Guam in the position of Tinian, probably taken from Drake. George Anson, who himself partook of a bounty of Spanish charts in the early 1740s, said that "the pleasing appearance of Tinian hath occasioned the Spaniards to give it the additional name of Buenavista," an identity confirmed by the le Gobien map of 1700 (Fig. 176).

The sixteenth century saw one more English circumnavigation, that of Thomas Cavendish. After traversing the Magellan Strait in 1587, Cavendish crossed the Pacific to Guam and the Philippines, adding nothing of consequence to Europe's mapping of the ocean.

The Marquesas: Mendafia's Second Expedition

As Drake and Cavendish were flying the English flag over the Pacific, Mendana fought to secure an expedition to further his discoveries in the Solomons. He knew that he would need to fix longitude more accurately, and thus hoped to be back on the islands during any of several predicted lunar eclipses. Had preparations gone smoothly, he might have made eclipses expected in September 1575, September 1578, or July 1581.

But not until April 9, 1595 did he set off from Peru with four vessels carrying colonists, soldiers, wives, and five rather odd sea charts—odd for their deliberate omissions. Chief pilot Pedro Fernandez de Quiros had been instructed to prepare one chart each for himself and the other four pilots, which were to contain only the Peruvian coastline and two points in the Pacific, one at 7° south, the other at 12° south, both 1500 leagues from Lima, the furthest distance it was believed the Solomons could lie. Lest anyone be tempted away from their arduous task, "no other land was charted, in case some ship should steer to or desert to it."

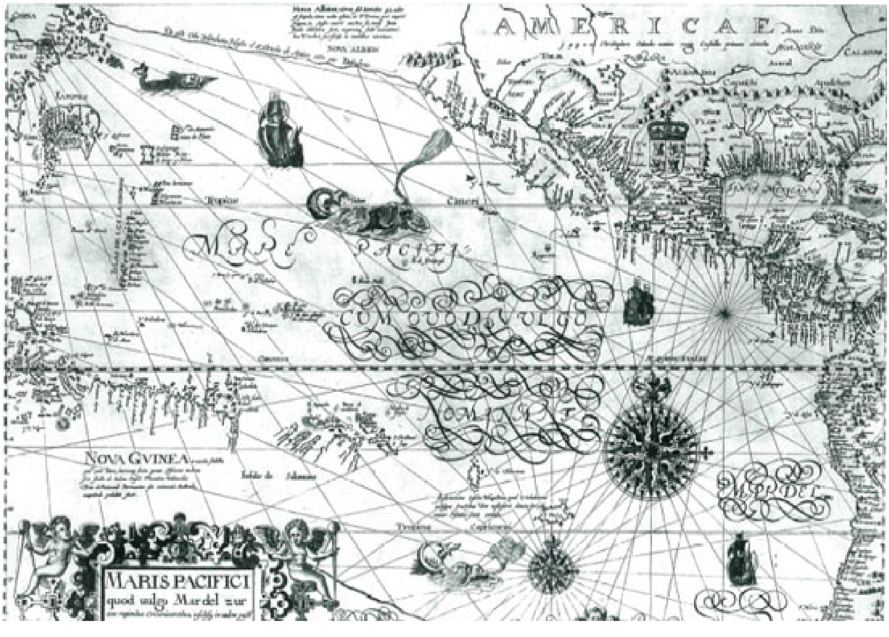


Fig. 64. Pacific Ocean, Gabriel Tatton, ca. 1600. Above the Marianas lie a few wayward islands, the old islands of silver (Plata), and some misplaced Micronesian islands. The Solomons, while following an established pattern (similar, for example, to Langenes, Fig. 59), have begun to move away from New Guinea. [Library of Congress]

After a bit of plunder along the coast to provision themselves and "exchange" an inferior vessel, they turned west to find the landfalls of nearly three decades earlier. On July 21, land was sighted which fit their charts' wide parameters of the Solomons' latitude, lying at about 101/2 ^{0} south. Soon "above 400 Indians came out in 70 vessels, others swimming, others upon floats: they had beautiful teeth, *eyes,* and mouths, delicate fine hands and feet, flowing hair, many of them very ruddy, and among them some of the most beautiful boys." Mendana thought he had found the Solomons, but this was a profound self-delusion, even in those days of rough longitude, for they were only halfway there, having sailed about 6500 kilometers. That the language was different, the people different, and the terrain unfamiliar, soon made him concede. They were in Fatu Hiva, the Marquesas, and named the new island Magdalena. This was the first European contact with any of the principal Polynesian islands, and the beginning of an enduring mystique about the singular beauty of the Marquesans.

Three other islands nearby were named *San Pedro* (Motane), "having much wood and fine plains, level, and not very high," *Dominica* (Hiva Oa), which "appeared very populous, delightfully pleasant, with fine plains, rising grounds, on which were seen spots of thick woods," and *Santa Cristina* (Tahuata), which was "high in the middle, with hills and valleys where the Indians dwell." Chief pilot Quiros was particularly enamored of the Marquesas, and cognizant of their strategic potential as a foothold between America and the Philippines. Here Quiros's desire to proselytize, which would eventually have him fight for another voyage to the Pacific as had Mendana before him, became evident: "I never in all my life felt such anguish," he wrote about an encounter with a Marquesan boy of about ten, "when I thought that so beautiful a creature should be left to go to perdition."

Mendana took possession of the four islands for Spain and attempted to leave settlers. But the idea was abandoned in the face of his soldiers' opposition, surely a lucky event for the Marquesans. These idyllic islands would later prove to be of great value as a stopping point en route to Hawaii and the Northwest Coast; but several generations would pass before Marquesans again saw such large vessels and fair-skinned visitors.

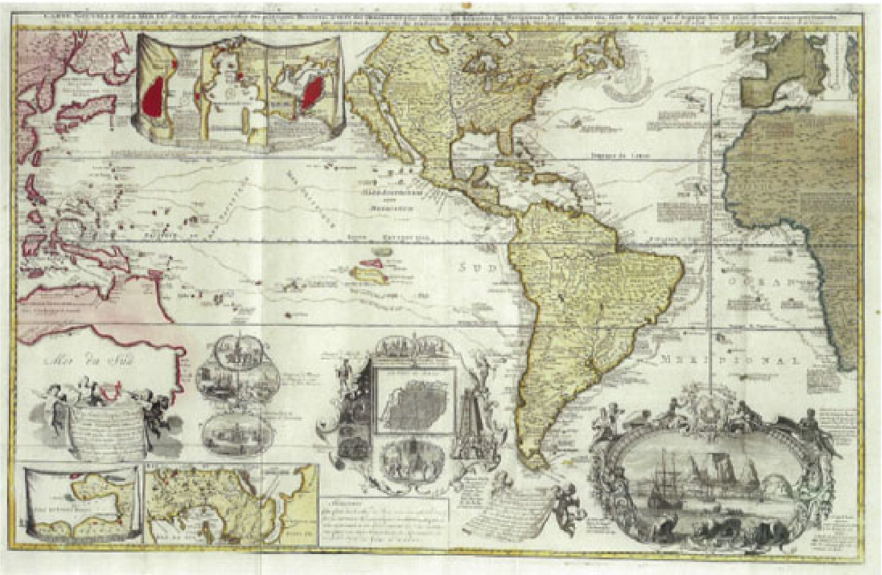


Fig. 65. Pacific Ocean, de Leth, ca. 1740. The southern coast of Australia merges into the eastern coast of New Zealand. Quiros's "lost" Solomons are the prominent islands just east of the mid-Pacific. [Martayan Lan, NY] *Overleaf.* Fig. *66.* Chart of the South Pacific, Joao Teixeira, 1630. [Library of Congress]

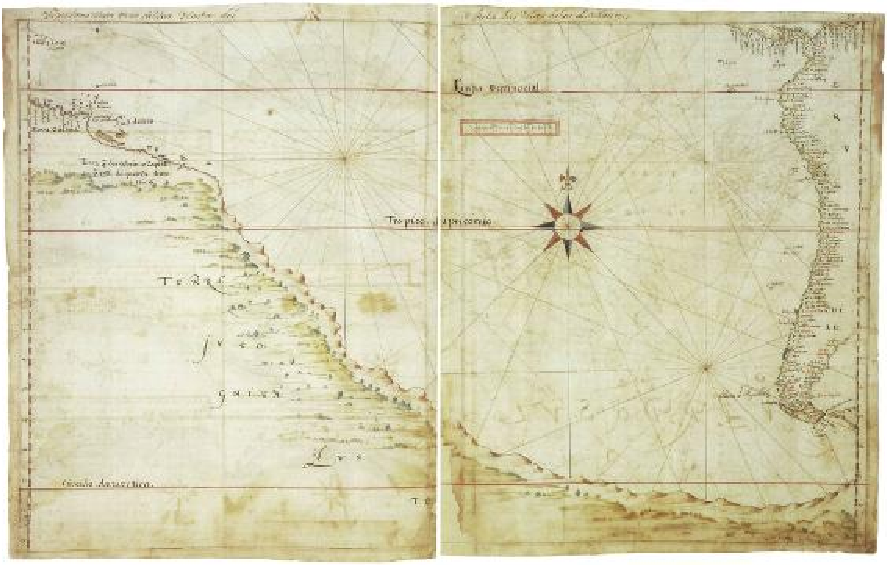
Leaving behind 200 Marquesans massacred from soldiers' bullets—that being his estimate—Mendana continued generally westward. The fleet was so plagued by dissatisfaction, disease, and violence among the crew, that the decision to have omitted all non-vital shores from their onboard charts had already proven savvy. Pilots complained that they had been sailing over rocks and over land "because the place where they had been painted had been erased from the charts." They were sailing in seas where, they realized from vestiges of shorelines still discernable, their charts originally had the Solomons or Terra Australis laid down.

A group of four islands was discovered which they named *Is las de San Bernado,* probably Puka Puka in the Cook Islands (not the same as Magellan's Puka Puka), and then a lone isle they called *Solitaria,* perhaps Niulakita in the Tuvalu group. A most unusual island then came into view, wooded and beautiful, with a cone-shaped hill on the west belching massive flames. They were witnessing an eruption of Tinakula in the Santa Cruz group (see d'Estrecasteaux, Fig. 170). A few days later, the entire crown of the volcano blew with a force that shook the ship.

Another island, populated, was discovered to the south. Again Mendana thought he had reached the Solomons, the islanders here looking more like those he remembered. But of the Solomon language they understood nothing, and he was again forced to concede that this was a new discovery, not their goal. Had he sailed another 400 kilometers to the west and northwest, he would have encountered the beginning of his lost archipelago.

The name he gave their new island, *Santa Cruz,* now denotes the entire group. They were in Ndeni (Nendo). As the island was pleasant and fruitful, its people generally peaceful and generous, Mendana again tried to leave colonists, but the soldiers, who were expecting an Ophir befitting its name, were out of his control. Not only did they kill for sport as they did on the Marquesas, but they now killed deliberately to start a war to sabotage any possibility of being left as colonists.

The state of the expedition grew increasingly desperate. When Mendana himself died of disease, his indulgent wife, Ysabel de Barreto, took command as per her husband's unfortunate directive, and it was left to Quiros to guide the remains of the fleet to Manila, a monumental feat for which history has not accorded him his due. His ship deteriorating, the crew incapacitated and dying, Ysabel de Barreto tried to undermine his authority, claiming most supplies as her own and even, so posterity has it, washing her clothes in a private supply of water as the rest of the crew were dying of thirst. One marvelous discovery, nonetheless, was made during this desperate flight—the Carolinian island of Pohnpei.



Whereas Mendanas first expedition produced immediate and profound changes to the mapping of the Pacific, the second did not. The Marquesas, which had no known European visitors again until the second voyage of Cook in 1774, received remarkably little attention from the Dutch mapmakers who dominated the printed map trade for most of the seventeenth century. They are recorded by Hessel Gerritsz on his manuscript chart of 1622 (Fig. 76), though most of the standard printed Dutch charts omitted them.

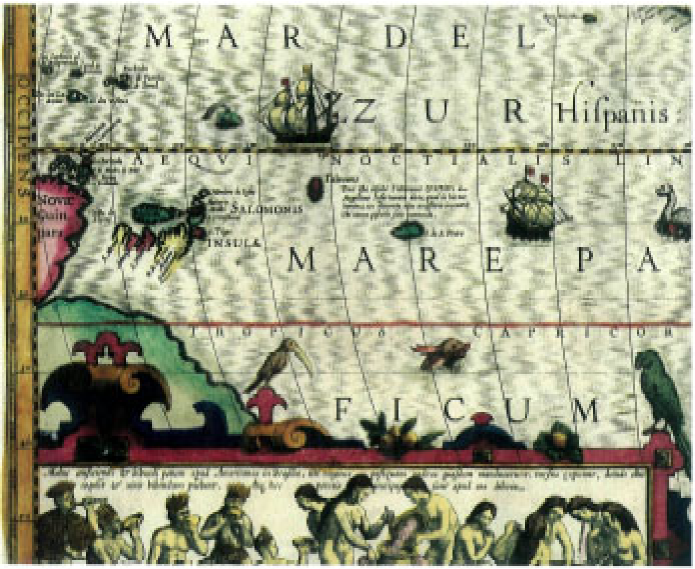
But the Marquesas made a prophetic reappearance on maps in the eighteenth century, before their rediscovery by Cook. De Fer, on his encyclopedic *Carte de la Mer du Sudoi* 1713 (Fig. 97) marks a small archipelago as *Isles du Marquis de Mandoge* in their approximately correct location, though ironically they appear just off the western shores of Guadalcanal, since the Solomons had been dramatically offset to the east, while J. B. Nolin included them on his map of 1740 without the confusion of the Solomons, just to the left of the upper vignette of ships (Fig. 68). Antonio Zatta (Fig. 115) depicted the Marquesas boldly in 1776, probably inspired by Cook's return at the end of July, the previous year.

Quiros and Torres

Mendanas chief pilot, Quiros, inherited the passion with which his former commander had fought for the voyage of 1595-6. Consumed by a desire to discover the great austral continent and to convert its people to Christendom, Quiros made his way to Rome in 1600 seeking patronage. There he presented to the Duke of Sesa, Spanish Ambassador to the Holy See, plans for a circumnavigation via Terra Australis for the purpose of testing new navigational instruments of his making, taking magnetic readings, and spreading the Faith. He and Mendana must have come close to the great austral continent on the previous voyage, he reasoned; now he would find it, and find the Solomons again as well.

Like Mendana, Quiros endured considerable bureaucratic obstacles, but finally set out from Callao in December 1605 with Luis Vaez de Torres as second in command. In failing health, Quiros established an unreasonably puritanical code of behavior for his crew, but succeeded in avoiding the ghastly bloodshed of islanders that had characterized the previous voyage. The fleet of two vessels and a launch planned to sail in a zig-zag in search of the austral continent: WSW until reaching 30° latitude, then if no land were found to sail N ¥ to 10°, then SW to 20°, and finally NW to 10° 15' where if no land had already been discovered, they would reach Santa Cruz (Ndeni) by sailing due west. But reaching 26° on the initial WSW course, the crew, afraid of finding themselves trapped in the vast gulf theorized on many maps (such as Ortelius's America of 1587, Fig. 57), grew so discontent that Quiros, against Torres's counsel, changed course. Several small islands in the Tuamotus were then discovered, none having any significant effect on maps beyond the Crown's own portolan charts.

Below. Fig. *67.* The southwest Pacific from Jodocus Hondius's map of America, 1606.
Opposite: Fig. 68. The eastern Pacific, from a wall map of America by Nolin, ca. 1740. Lands reported by Mendana, Quiros, and Davis are marked.



In early April, when Quiros's crew were on the verge of mutiny, the largest of a chain of islands was discovered. Quiros learned that the native people called their land *Taumako,* by which name this member of the Duff Islands is still known. They were about 150 kilometers northeast of their target of Santa Cruz (Ndeni).

Quiros was impressed by the islanders, relating that they "are great seafarers, and the vessels in which they sail are large and can go a great way." With their planked decks and outriggers, they were capable of carrying thirty to forty people. The people appeared to have heard about the Spanish from their visit to Santa Cruz twenty years earlier. They explained that the volcano (Tinakula) lay five days' sail to the west, and that it, in turn, lay close to the island of *Indeni* (Ndeni), which Quiros recognized as the indigenous name for Santa Cruz. Travel among these islands was routine, and the king of the island, Tumai, dispatched a canoe to Santa Cruz to pass on news of the fair-skinned strangers' presence.

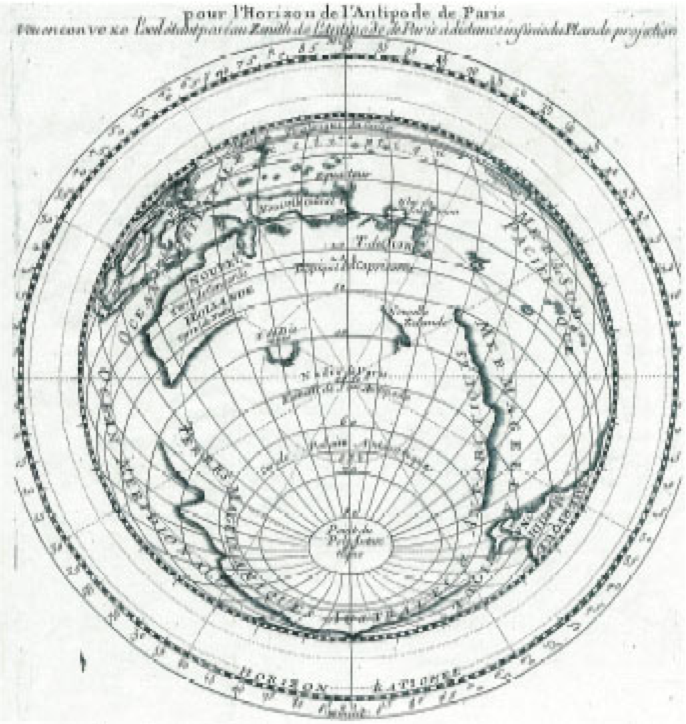
Quiros tapped Tumai's geographic knowledge. The king listed seventy islands for Quiros, indicating their distance by sailing time: "He pointed to the sun, then rested his head on his hand, shut his eyes, and with his fingers counted the number of nights one had to sleep on the voyage." Tumai drew circles on the ground to map their relative size, except for the larger ones, for which he opened his arms. But it was the island called *Manicolo* (perhaps Malekula in Vanuatu) that most intrigued Quiros, because when King Tumai described its size, he opened his arms without having them meet, "showing that it continued." Could Manicolo, Quiros wondered, be the great southern continent?

Geographic information was also gathered from a hostage taken at Taumako, whom they named "Pedro." Pedro described an island called

Tucoopia (the small island of Tikopia, about 300 kilometers to their southeast), and that a five days' sail from it lay Manicolo, the island of which the king had spoken. Two days with a good breeze brought one to a group of low islands called *Fonfono* (Lomlom, Reef or Swallow group), and near to these lay *Pilen* and *Nupan.* Among the other islands cited by Pedro was one called *Pouro.* A navigator whom he knew had returned from the island with a red-breasted parrot and white-tipped arrows.

Freshly armed with these geographic tidbits, Quiros abandoned his original objective of Santa Cruz. The possibility that Manicolo was the legendary austral continent was too seductive. With Pedro guiding them to the southeast, they passed Tikopia, and then discovered various islands in Vanuatu (New Hebrides). The profusion of islands reinforced Quiros's illusion that he was on the brink of a continental landfall, and when a major coast appeared, he named it *Espiritu Santo,* believing that he had reached it. In this he was deceived not just by his own dreams, but also by the coasts of neighboring islands, which from his approach would have appeared as one. To their anchorage on the southeastern corner, they gave the name *Vera Cruz,* to their settlement, *New Jerusalem.*

MER
PACIFIQUE
et MER
DU SUD
DESCRIPTION HISTORIQUE
DE L'AMERIQUE

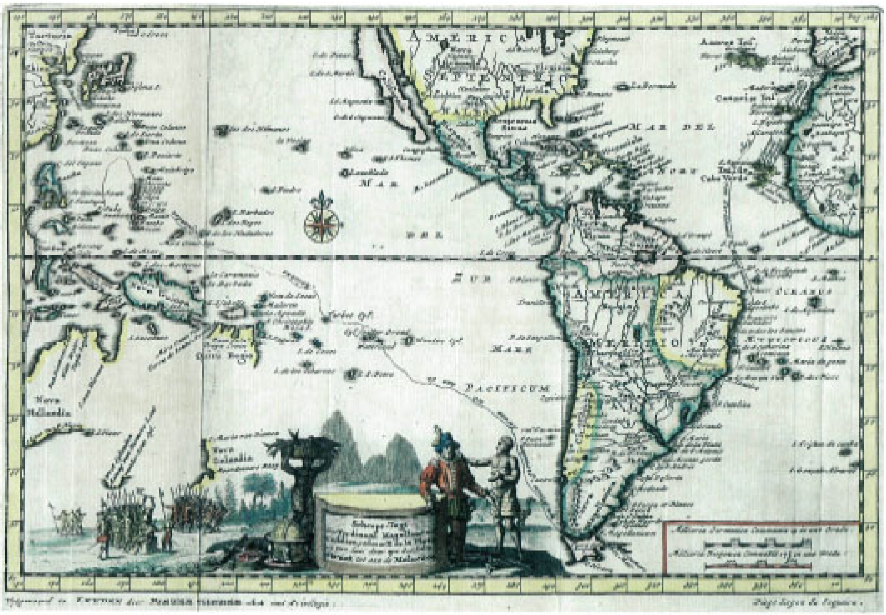


With the threat of mutiny ever present, there followed three weeks of disappointing relations with the islanders, who were not receptive to Quiros's proselytizing. A decision was made to sail to the mountains sighted to the south, but the winds proved uncooperative. For reasons which remain disputed, Quiros, instead of returning to Espiritu Santo, suddenly headed back to Peru via Mexico, leaving the expedition under Torres. "The *Captana* departed without signal, and although next morning we went in search of them we could not find them," Torres wrote. After waiting fifteen days, Torres sailed along the east coast of Espiritu Santo and saw that it was an island, then turned to the northwest and reached the southeastern coast of New Guinea.

Torres's finest moment came after he tried to round the island's eastern coast but was prevented by doing so by contrary winds. Navigators before and long after Torres had feared sailing south of New Guinea because they did not know whether it was an island or part of a greater austral landmass, and if it were the latter, the prevailing easterly winds might prevent a vessel from ever returning. If no passage were to be found below New Guinea, there was no known wind with which they could sail back out. This "oneway gulf" that mariners feared, had been shown or alluded to by various mapmakers (for example, Ortelius, Fig. 57). The same fear of being trapped by one-way winds and currents would similarly delay discovery of the east coast of Australia.

But Torres, weighing this risk against that of waiting for the season of northwest winds, decided to gamble that a passage existed on the south of New Guinea, and sailed west through the strait which now bears his name, a treacherous passage strewn with reefs, islands, and currents. He skimmed southern New Guinea and perhaps sighted northern Australia, then found his way to the Philippines via the Moluccas, reaching Manila on May 6, 1607.

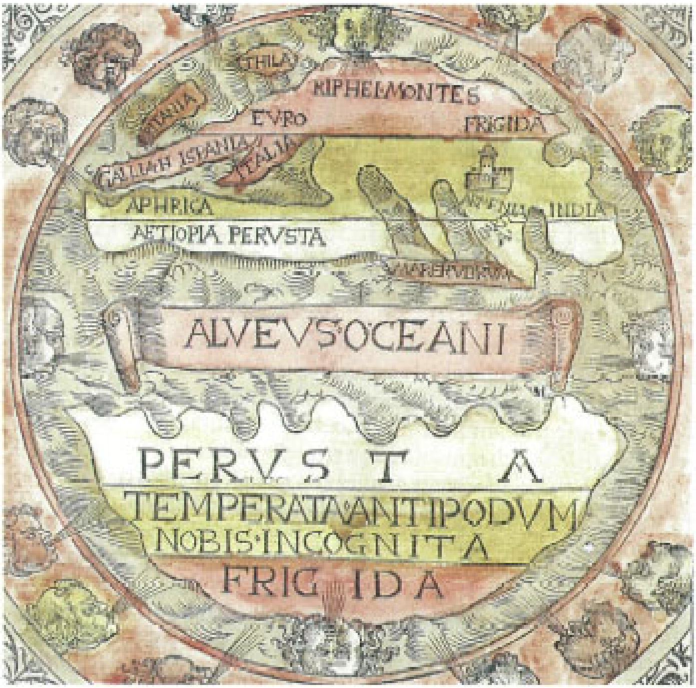
Diego de Prado, navigator on the second vessel, drew charts of their path and kept a journal of the voyage. Thirty-four days, de Prado wrote, were spent sailing the strait, and Torres reported seeing large islands to the south—possibly having sighted Australia. Among the other Iberian chartmakers who depicted an insular New Guinea was Godinho de Eredia, one of the most intriguing chartmakers of the time. Yet Torres's important discovery eluded general knowledge until the 1760s, when Alexander Dalrymple learned of it from Spanish archives in Manila.



Above: Fig. 69. In about 1697, Pierre Moullard-Sanson constructed double-hemisphere world maps on curious perspectives. One, intended to show the earth as it would be seen from the interior looking out, depicted the earth's surface features in mirror image. Another, illustrated above, used Paris rather than the poles or the equator as its pivot. This meant that the adjoining hemisphere, illustrated here, had to be pivoted on the point exactly *antipodal* to Paris, which lies in the southern Pacific (actually further east than he calculated, relative to Tasmania and New Zealand). Thus, the map affords us a good glimpse at how the Solomon Islands and Quiros's land were juggled around intervening discoveries, principally those of Tasman. *Left-*. Fig. 70. Magellan's path is sloppily plotted on this map by Pieter Vander Aa, 1706. *Mira como vaz* ("watch where you're going"; see page 181) gratuitously marks the strait between New Guinea and *Quiri Regio,* Quiros's then mysterious discoveries in Vanuatu.

The chartmaker Joao Teixeira was typical in envisioning not just New Guinea as a region of Terra Australis, but Quiros's discoveries as well, marking "land discovered by Quiros in the year 1606" just southeast of New Guinea (Fig. 66). Other mapmakers reduced Quiros's discoveries to a "Terre de Quir," this "Land of Quiros" sometimes an amorphous landmass on its own, such as shown by de Fer (Fig. 97), or integrated into later discoveries, such as into New Zealand at the hands of Mallet (Fig. 91).

Quiros's obsession with discovering and Christianizing the austral continent was not dampened by the failure of the voyage. He returned to Spain to ask to be granted another expedition into the Pacific, to which the king consented. Daunting obstacles remained, however, and it is doubtful that the voyage would have ever materialized, even if Quiros had not died in Panama on the way back. Thus ended the great age of Iberian exploration.



Above: Fig. 71. World map after Macrobius. One of the most widely copied world views in medieval Europe, this map depicts one hemisphere of a spherical earth. The upper continent comprises Europe, Africa, and Asia, and the lower is an antipodean land, part of the long tradition of austral shores that influenced Pacific explorers such as Quiros. Two continents on the unseen "far" half of the earth partitioned in two the sea between Europe and Asia as America would do when discovered a millennium after Macrobius. This particular example is a woodcut from 1521. [Wesley Brown] *Below:* Fig. 72. World map by Petrus Plancius, 1594. Plancius depicts New Guinea as part of Terra Australis, though nearly severs them with a river on the west (right hemisphere). The northerly promontory of Terra Australis directly below Southeast Asia contains place names from Marco Polo, being Lucach, Maletur, and Beach, all of which would be merged into Australia when discovered. [Martayan Lan]

ORBIS TERRARVM TYPVS DE INTEGRO MULTIS IN LOCIS EMENDATUS auctore Petro Plancio 1594
EUROPA
ASIA
PERUANA
MAGALLANICA
TERRA AUSTRALIS

Chapter 5

Earliest Mapping of Australia and New Zealand

For most of the sixteenth century, the Spanish and Portuguese were the only European interlopers in the Pacific, save for a voyage to the western Sumatra port of Ticon by two brothers from France, Jean and Raoul Parmentier, in 1529. But Holland flew onto the stage with a storm when Cornells de Houtman reached Indonesia in his voyage of 1595-7, bypassing the Malacca Strait guarded by the Portuguese and entering instead through the Sunda Strait between Sumatra and Java. Dutch enterprises competed for the Indies market following his successful return, leading to the birth of the Dutch East India Company (VOC) in 1602.

The establishment of Batavia, on the north coast of Java at what is now Jakarta, as the Company's Asian headquarters, soon led to two geographic breakthroughs. First, exploration in New Guinea resulted in the recorded European discovery of Australia. Secondly, the Company's monopoly on trade through the only known routes to the Pacific provoked outside business interests to question the prevailing image of Tierra del Fuego as part of an austral continent, a view best illustrated on de Jode's world map of 1593 (Fig. 56).

Considerable controversy has occasioned the question of European knowledge of Australia before its recorded "discovery," and most of the evidence cited to support such claims comes from early maps of three basic categories. In chronological order of the claimed discoveries, they are: maps from 1541, 1569, and later which depict a land of "Beach" on Terra Australis (and eventually on Australia itself), interpreted as reflecting late medieval knowledge of Australia, based on Marco Polo's text; a rendering of Terra Australis depicting a so-called "Java-la-Grande," or other odd fragments of land, believed to represent unrecorded discovery in the early sixteenth century; and a shore discovered in 1601 called "Lucaantara" (or Luca Antara) which was recorded by a Portuguese cartographer, Manuel Godinho de Eredia.

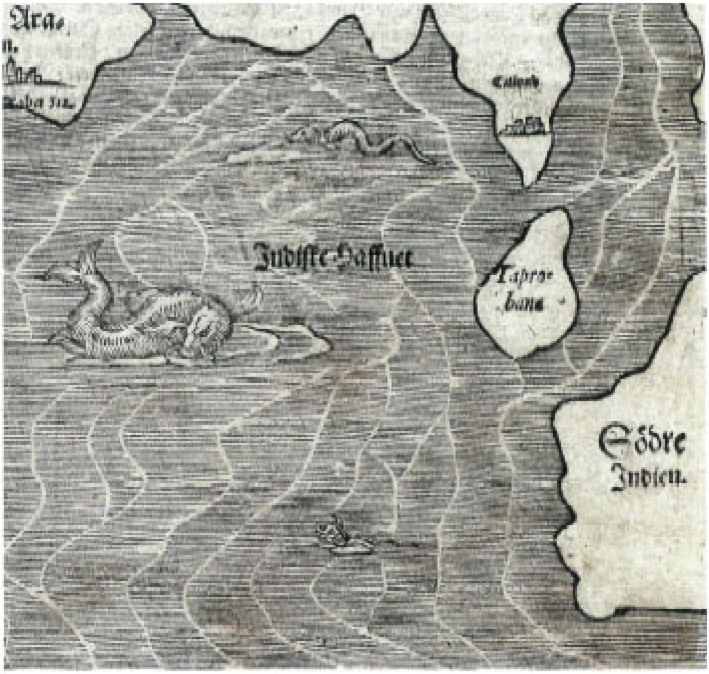
The first instance, "Beach," which appeared on numerous maps into the 1600s, can safely be discredited. A marvelous textual confusion which befuddled mapmakers, and in turn explorers, its origin is clear enough that few would now cite it as evidence of medieval European knowledge of Australia (see page 85 below).

The second category, in contrast, has aroused the greatest amount of interest. Beginning in the 1540s, some chartmakers working in the northern French port of Dieppe began depicting a lavish "Java-la-Grande," a variation of Terra Australis, replete with geographic and ethnographic detail. The land contained nomenclature which would appear to be from actual discovery, and usually depicted rich fauna and vegetation. Scholarly wrangling over Java-la-Grande began after Cook's discovery of eastern Australia, when Alexander Dalrymple concluded that one such chart's *Coste des Herbaiges* ("coast of vegetation") was Cook's Botany Bay.

The chartmakers in Dieppe had access to data from Spanish and Portuguese navigators, as well as the opportunity to interview pilots and sailors themselves. Taverns in Dieppe must have been awash in sailors' gossip, and Java-la-Grande may represent imperfectly pieced together bits from their charts and oral reports. Reference to discoveries by the Parmentier brothers appears on some of these charts, but there is too little known about the voyage to make sense of the vague cartographic evidence.

How this enigmatic land was envisioned fitting into "known" terrain can be seen in the chart in Fig. 47. Whether or not Europeans reached Australia earlier than recorded, the Java-la-Grande of these charts is more likely a whimsy sparked by medieval texts which suggested a vast Java, combined with the discovery of the perceived "Terra Australis" coast to the south of the Magellan Strait. The appearance of empirical evidence on enigmatic coasts likely came when chartmakers fused together charts of Indonesian shores at inconsistent scale and orientation. Some of the very chartmakers that flaunted Java-la-Grande (for example, Pierre Desceliers, 1546) accompany it with an inscription stating that it has never been discovered.

Fig. 73. Detail from a map by Bünting, 1581. The resemblance of the landmass below Sri Lanka (*Taprobana*) to Australia is coincidental. See also Fig. 26.



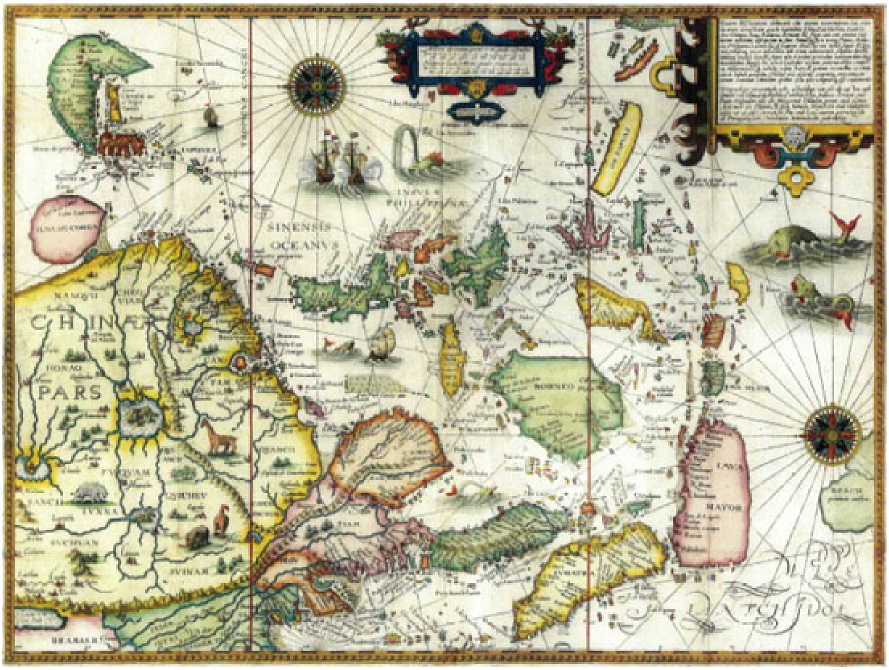


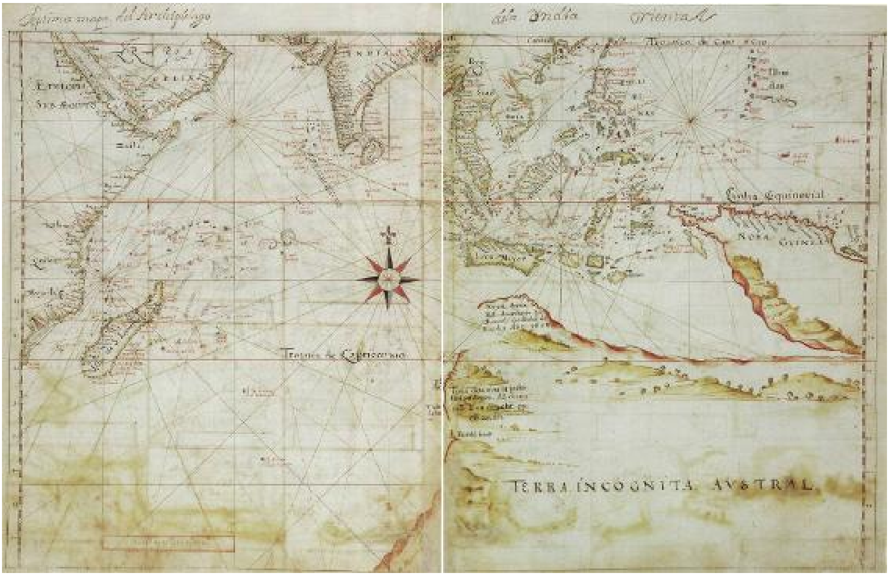
Fig. 74. Linschoten, 1595 (1596). Note *Os Papuas,* which is Irian Jaya as a separate island from New Guinea, and the land of Beach to the south of Java. *Overleaf.*
Fig. 75. Southwest Pacific, Joao Teixeira, 1630. The realm of "Nuca Antara," purported pre-Dutch knowledge of Australia, is recorded. [Library of Congress]

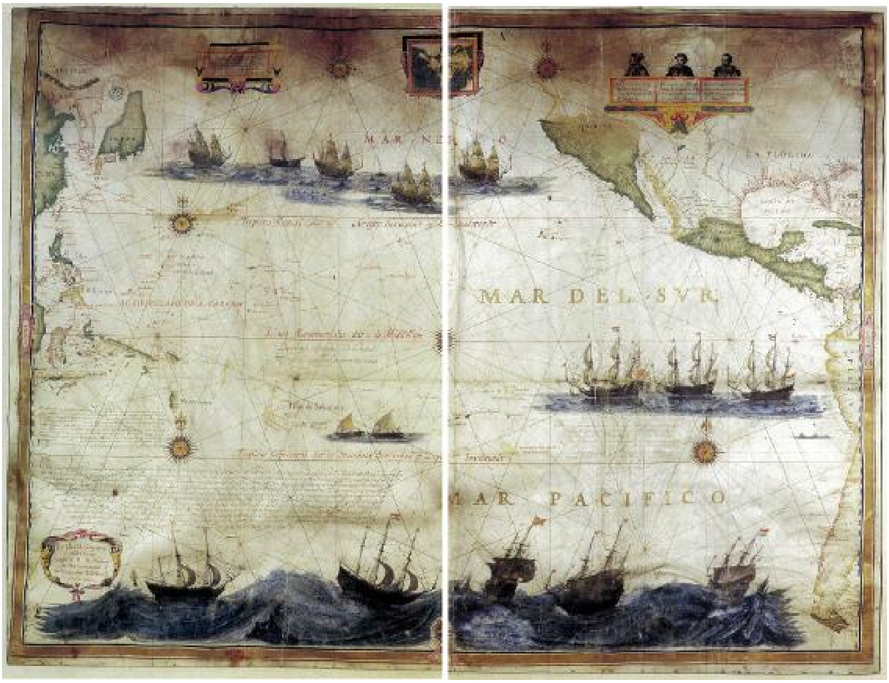
Shortly after the Dieppe phenomenon, which involved manuscript charts, a few printed maps depicted coasts that have been attributed to early knowledge of Australia from unknown sources. A 1571 map of the world by Arias Montanus, otherwise unremarkable in its geography, portrays what would appear to be Australia's northern coast, and the 1581 map by Heinrich Bunting (detail, Fig. 73) boasts a shoreline remarkably like that of western Australia. Montanus, at least, was known to have been interested in new discoveries, but for Bunting to have had access to otherwise secret new data would be an anomaly, to say the least.

Most likely these are coincidental similarities. The Montanus "northern Australia" was likely born from the many variations of the hypothetical Terra Australis coast, and the Bunting "western Australia" either from the vestiges of the huge Southeast Asian subcontinent found on Martellus-type maps or, more likely, from earlier constructions of Tierra del Fuego. Bunting's coast, indeed, is virtually identical to the Tierra del Fuego found on the 1554 hemisphere map of Tramezzino, and little different than a mirror image of the arbitrary shape given a hypothetical southern continent by Schoner in 1515 (Fig. 26).

In 1629, the Viceroy of India received a letter from Portuguese authorities "concerning some discoveries described by Manuel Godinho de Eredia." The letter instructed the Viceroy to "endeavor to learn with certainty, from whatever sources may be most appropriate, what land this is, and of what significance, what ports, entries, and anchorages there are, what people live there, what fruits and nuts it produces and anything else that may be ascertained of this discovery."

What shores did this refer to? Godinho de Eredia, a Portuguese chartmaker convinced of the existence of a Southland, claimed that in 1601 a Javanese prince had reached a land called "Lucaantara" in the Southwest Pacific, and that this was part of a great austral continent. Whether Godinho de Eredia, whose charts of Southeast Asia demonstrate that he was able to tap local data not found on mainstream maps, was recording knowledge of northern Australia five years before its discovery by the Dutch, will probably never be known. The chart of the Southwest Pacific by Joao Teixeira records Lucaantara *(Nuca Antara)* at about the latitude of Arnhem Land (Fig. 75). Although it is placed at a longitude west of even westernmost Australia, the "true" Dutch discovery of western Australia is also misplaced to the west.





There is little doubt that now nameless Indonesian and Chinese mariners reached Australia, whose northern coast lies close to old Indonesian trade routes. But neither Indonesian nor Chinese merchants were concerned with exploration for its own sake, and northern Australia offered no trade products to entice their return.

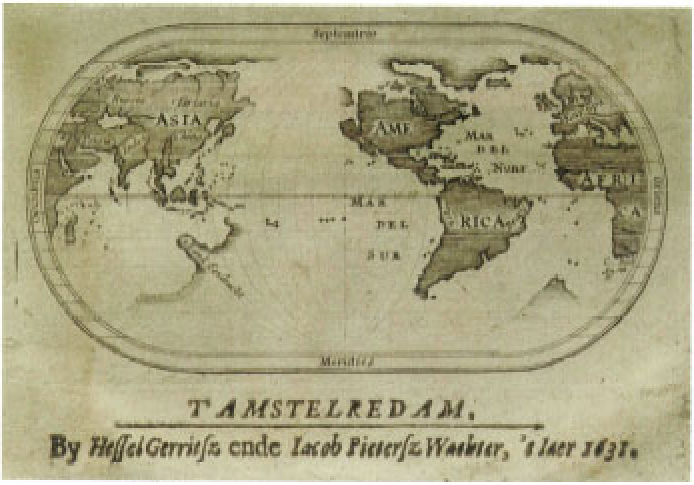
Mapping the Dutch Discovery of Australia

Whatever Godinho de Eredias land actually was, and whether or not earlier cartographic allusions to Australia were fancies born on the cartographer's desk, the earliest definite European sighting of Australia was that by Willem Jansz in the pinnace *Duyfken.*

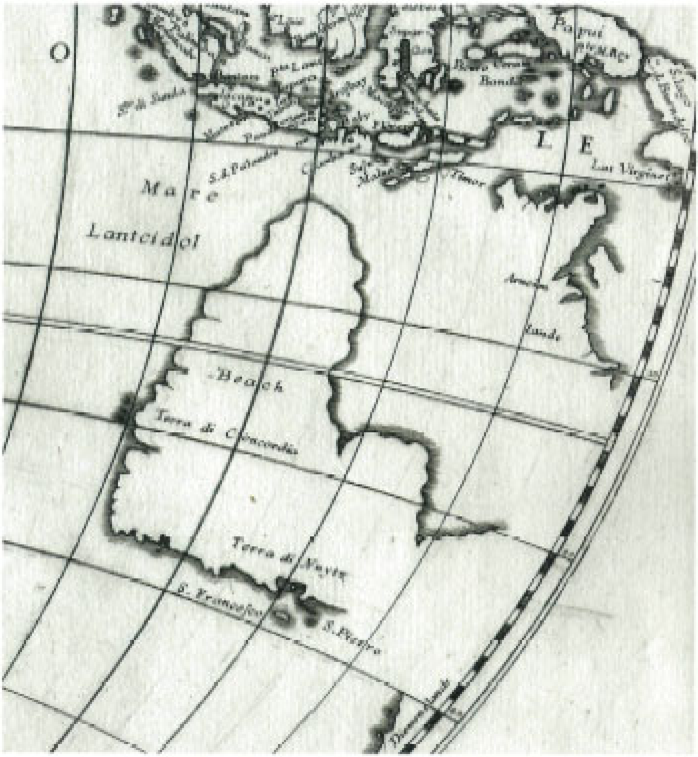
Sailing from Banten in 1606 for the purpose of investigating New Guinea, Jansz encountered the western shores of the Cape York Peninsula and followed it to a cape he dubbed "Keerweer" ("turn again"), then returned to Batavia. There is no indication that he suspected that a strait separated New Guinea from the Cape York Peninsula, and so the entire region was understood as being part of New Guinea. The official cartographer of the Dutch East India Company, Hessel Gerritsz, included the coasts sighted by the crew of the *Duyfken* on his 1622 chart (Fig. 76), and named Australia *Duijfienslandt* ("Dove Land") after the discovering vessel. The public did not see Gerritsz's chart, but as early as 1626 traces of the discovery appeared on maps published in books (Fig. 77).

Thus began the slow, methodical mapping of Australia. Other expeditions quickly followed, notably Jan Carstenz's exploration of the western part of Carpentaria in 1622-3, and Francois Thijssen's following of the Australian coast fully around to the Great Australian Bight, the vast arch of the southern coast, in 1627.

Fig. *77.* The first map in a published book to show Australia ('tLand Eendracht') in this title page by Jacques l'Hermite, 1626 (1631). [Gowrie Galleries]


Septentrio
ASIA
AME
MAR DEL NORT
AFRI
CA
MAR DEL SUR
RICA
Meridies
T'AMSTELREDAM.
By Hessel Gerritsz ende Iacob Pietersz Wachter, 't Iaer 1631.

Previous pages: Fig. 76. Pacific Ocean, Hessel Gerritsz, 1622. Although dated 1634, this chart is believed to have been made in 1622, the original date having been amended, perhaps by Gerritsz's successor as hydrographer of the VOC, Willem Blaeu. [Bibliotheque Nationale, Paris] *Belour.* Fig. 78. G. B. Nicolosi, 1660. This early published record of Tasman's discoveries (Diemens landt, lower right) reflects the room for interpretation left to cartographers in the first decades following the discovery of Australia, before its western and northern coasts were laid down with reasonable continuity. New Guinea *(Papui*) is in the upper right corner, just west of *S. Iago,* one of Mendafia's Solomons.



Western Australia was discovered independently during otherwise routine voyages to Batavia via the Cape of Good Hope. The Dutch initially followed the route of their mentors, the Portuguese, paralleling the African coast north and then turning east; but since this route was subject to the seasonal monsoons, in 1611 a Dutch commander named Brouwer tried exploiting westerly winds after rounding the Cape, sailing east to the approximate longitude of the Sunda Strait, and then turning north. The result was an astonishingly quick voyage, and subsequent experiments demonstrated that the new route cut the time of the Holland-Batavia trek in half or better. But since their eastward progress through the Indian Ocean was judged by dead reckoning, some pilots inevitably sailed further east than intended and stumbled across the western coast of Australia. The first documented such sighting was by Dirck Hartog in 1616, who named the western Australian coast *Eendrachtsland* after his vessel, a name widely adopted by mapmakers.

The waters off western Australia also presented risks, however, as an unfortunate English crew discovered when attempting to copy the new Dutch route. In July 1622, one boat and one sloop, with a total of forty-six men, reached Batavia, these being the only survivors of a wreck off rocks which became named for the lost vessel, the *Trial* (marked, for example, in Fig. 168). The disaster occurred at night, but in fine weather and with no land in sight. If the new route was to be reliable, the region would need to be mapped to avoid such catastrophes.

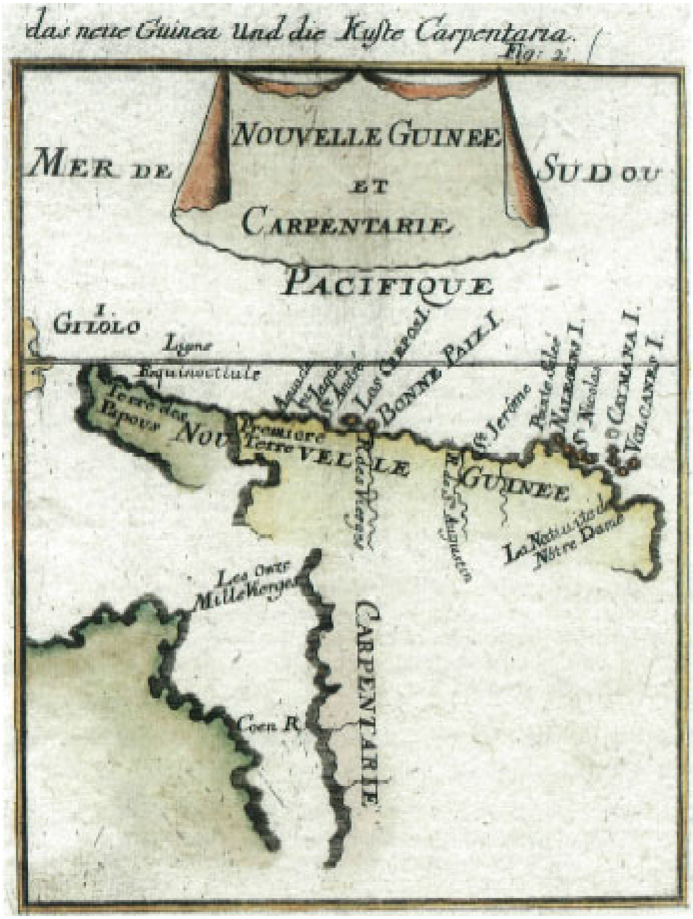
To that end, the following year (1623) two yachts, the *Arnhem* and the *Pera,* left Amboina (Ambon), due west of New Guinea, under the command of Jan Carstenz in the *Pera.* The little fleet followed the southern New Guinea coast to what it called "Drooge Bocht," meaning "shallow bight." But their "bight" was actually the Torres Strait, the southern end of it the Cape York Peninsula. A chart carried on board showing the possibility of a passage piercing the land was supposed to be in error. The coast of "southern New Guinea" (Australia) was followed to 17° 8' south.

At this point, however, the *Arnhem* unexpectedly separated from the fleet, Carstenz believing that its crew had deliberately deserted for "pleasurable" ports. Whatever the circumstances, we know only from its influence on subsequent charts that easterly winds blew her across the Gulf of Carpentaria to the land which still retains the name of the vessel—Arnhem Land.

The "Pacific" Land of Beach

The discoveries of the crew of the yacht *Arnhem* are among the reports fused together in the 1660 map by Nicolosi (Fig. 78) as *Arneim landt,* immediately south of New Guinea. The geography is reminiscent of the Cobourg Peninsula (directly below the word *Las*) and neighboring coast of the Northern Territory, and Melville Island, but in mirror image, as if copied from some regional chart without inverting it on the copperplate. Nicolosi chose not to presume that the rest of Australia was contiguous with Arnhem Land, instead leaving the matter ambiguous.

Fig. 79. New Guinea and northern Australia, Allain Mallet, 1683.


das neue Guinea und die Kuste Carpentaria.
Fig: 2.
NOUVELLE GUINEE ET CARPENTARIE
MER DE
SUD OU
PACIFIQUE
GILOLO
Ligne Equinoctiale
Terre des Papous
NOUVELLE GUINEE
Premiere Terre
Los Crespos
BONNE PAZ I.
St. Jerôme
CAYMANA I.
VOLCANES I.
St. Augustin
La Nativité de Nôtre Dame
Les Onze Mille Vierges
Coen R.
CARPENTARIE

The most prominent identification given Australia on Nicolosi's map is *Beach,* which designates the bulk of the landmass south and west of Arnhem Land. On July 19, 1619, Frederick de Houtman was commanding two Batavia-bound vessels when, sailing east in the Indian Ocean at 32° 20', suddenly they "came upon the Southland of Beach." But if this was a new discovery, why did de Houtman invoke the name "Beach" as though he knew where he was? The reason was that he had, in fact, already seen this land of *Beach* on maps, right where the shores before him lay. He thought he had *found* Beach, not discovered it.

The "Beach" he knew from contemporary maps was a region of an austral continent that climbs into the lower southern latitudes below Indonesia. Among the many such maps de Houtman had probably seen are those of Ortelius (Fig. 63), Plancius (Fig. 72), and Linschoten (Fig. 74), all of which place the realm of Beach directly below Java.

Reaching Beach had been a goal of previous explorers. Francis Drake had hoped to locate Beach, but upon entering the Pacific contrary winds made a westward reconnaissance in the high latitudes impossible. One of Drake's vessels sank in the attempt, and another, whose master soon refused to steer toward Beach for the danger of the winds, was forced to return home.

Beach, however, was born not from contemporary exploration, but rather from a printing error, several decades earlier, in a rendering of the text of Marco Polo's travels to the East. When Polo sailed from China to Persia en route back to Italy in the 1290s, the vessel he rode stopped at a kingdom he called *Lucach,* which modern scholars generally consider to be Thailand, but might have been Borneo. Various geographers of the late medieval and early Renaissance period found differing solutions to the riddle of Lucach's location, based on their interpretations of the manuscript versions of Polo's text which circulated amongst them. But when Polo's text appeared in Johann Huttich's *Novus Orbis Regionum* in 1532, the section about *Lucach* was included twice: once in its usual rendering, but then mistakenly a second time in the corrupted form "Beach." A kingdom was born that existed only in maps.

Gerard Mercator, unaware of the error, tried to find a home for the realm of Beach when he composed his great globe of 1541. Coincidentally, the concept of a great austral continent then being raised from dormancy provided a logical answer. Following Polo's ambiguous itinerary to Beach brought Mercator to the south of Java, an area then ripe to be seen as part of the unknown southern continent. His conclusion that Beach was a region of this Terra Australis was, like many of his blunders, eminently logical.

Hence Nicolosi, depicting northern Australia in a fashion inspired by the contour of the Terra Australis of Mercator and others, still considered it to be all part of greater Beach. Medieval geographers had erred, so it seemed, in believing Beach to extend so far south—Abel Tasman had already sailed south around it and thus exposed that misconception—but that did not dispel the belief that the land of Beach was real. Indeed, Beach had now been rediscovered, exactly where many maps (for example, Fig. 72) had placed it. Nicolosi has labeled the sea to the west and north of Beach as *Lantcidol,* from *l'Antichthones,* a term used by Pliny in the first century to refer to Taprobana (Ceylon), and which came to denote southern Asian realms in general. The term was transferred to Southeast Asian waters in the Renaissance because of the erroneous (but pervasive) belief that the Taprobana of Ptolemy and other ancient writers was Sumatra rather than Ceylon.

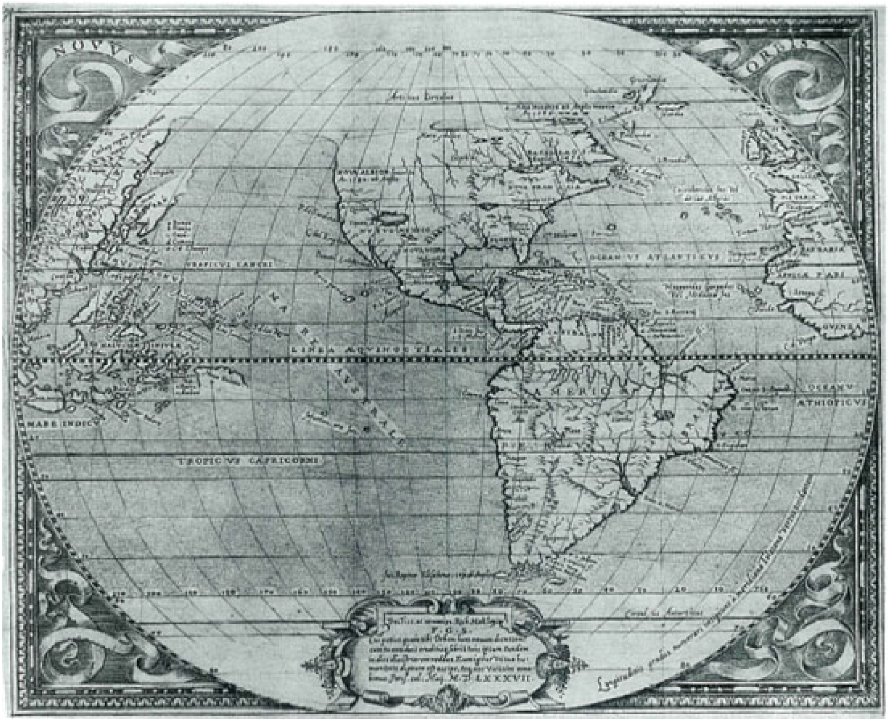


Fig. 80. America, Richard Hakluyt, 1587. Tierra del Fuego is depicted as a series of islands, rather than as a northern promontory of a vast continent, which is absent altogether. New Guinea is delineated without supposition, thus only the northern coast appears. The Marianas are marked by the corrupted form *Latronum* (instead of *Ladrones*) as on the Munster map of America and as indeed found in English text as early as Richard Eden's *Decades* (1555). The map's Pacific otherwise contains the usual inventory of islands from Spanish voyages. [Martayan Lan, NY]

South of Beach is *Terra di Nuytz,* the "Land of Nuytz," after Pieter Nuyts, an official of the Dutch East India Company. Nuyts was aboard the vessel V *Gulden Zeepaard*which sailed from Holland in mid-1626, discovering part of the western Australian coast before reaching Batavia in April 1627.

Mallet was typical of many mapmakers in leaving the relationship between New Guinea and the long coastline of Carpentaria unknown (Fig. 79), unaware that Torres had sailed through the strait now named for him at about the same time that Jansz sailed by its western mouth. Cape York is named *Les Onze Mille Vierges* (Eleven Thousand Virgins) for the medieval tradition of St. Ursula, the daughter of King Dionotus of Cornwall. To the north, Irian Jaya (western New Guinea) is depicted ambiguously, as its western peninsula was sometimes confused with the island of Seram, or thought to be separate from the main of New Guinea. An East India Company expedition in 1791 still believed that western Irian Jaya was a separate island, and only in the course of charting the anticipated "strait" was the matter settled. What became known as the McCluer Gulf leaves New Guinea intact by a neck as little as 15 kilometers wide.

Jacob Le Maire

When Ferdinand Magellan penetrated the strait he discovered at the tip of the South American mainland, he had no reason to investigate the land to his left, Tierra del Fuego. His only purpose was to pierce through the continent into the Eastern ocean, and having succeeded in doing so, he sailed away leaving the nature of Tierra del Fuego to the imaginations of a century of cosmographers.

Within a decade of the expeditions return, the dominant view of Tierra del Fuego was that it was part of an austral continent, perhaps a modest one as envisioned by Tramezzino or Gastaldi (Fig. 36), or the vast world hypothesized by Monachus (Fig. 32), popularized by Fine (Fig. 33), and codified by Mercator (for example, Ortelius, Fig. 63, and de Jode, Fig. 56).

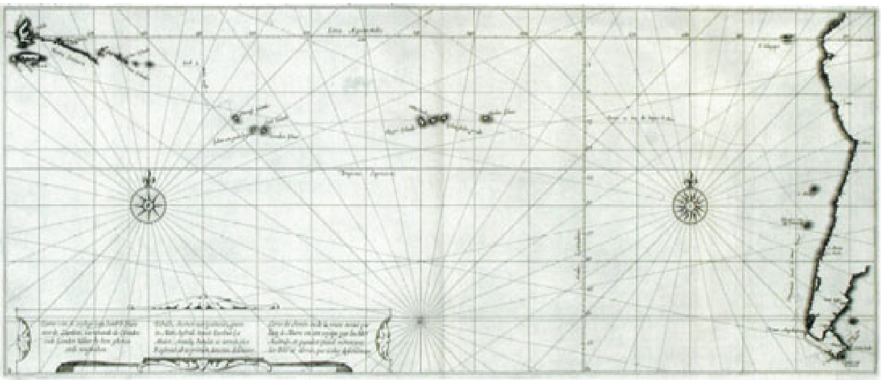


Fig. 81. The tracks of Le Maire and Schouten across the south Pacific as far as New Guinea and Halmahera. Le Maire, 1619 (Herrera, 1622).

The consensus was not complete; as Sebastian Munster wrote in *A Treatyse of the Newe India,* "the land which [Magellan] had on his right hand [South America], he doubted not to be mainland: and that on the left hand [Tierra del Fuego], he supposed to be

Fig. 82. Cocos and Home Islands, Robert Dudley, 1647. [Kauai Fine Arts]

Mare del Sur
Horne Iland
Il Tropico di Capricorno
Corrente per Ponente
Oceano Australe

Islands." But Mercator's, and in turn Ortelius's, acceptance of the austral continent was so influential that scarcely an exception could be found in maps printed during the last third of the century.

The seed of disbelief in the continental Tierra del Fuego was planted by Francis Drake during his circumnavigation of 1577-80. Although Drake entered the Pacific by the Strait of Magellan, uncooperative winds had first blown him south of its entrance. Before sailing north again to regain the strait, he was surprised to see open ocean to the south. A handful of maps composed during the couple of decades after his return modified the mainstream depiction of Tierra del Fuego to reflect this, all of them by cartographers who were English or had some other direct contact with London. First among these was a map of America in Richard Hakluyt's 1587 translation of Peter Martyr's *De Orbe Novo* (Fig. 80). Hondius (Fig. 60), who had been resident in England, includes a legend questioning the matter, while the world map by Wright-Molyneaux (1599) abandons Terra Australis altogether, save for a brief (Australian?) coast below Java. Hondius made further maps depicting Tierra del Fuego as a series of islands for le Clerc (Fig. 83).

The theorists and fledgling Pacific traders of England may have found this interesting, but for the entrepreneurs of Holland it was downright exciting. In the last half decade of the sixteenth century, independent Dutch voyages had reached the southwest Pacific via Africa and the Sunda Strait, but when the Dutch East India Company (VOC) was formed in 1602, it granted itself a monopoly on all Indies trade via the Cape of Good Hope or through the Strait of Magellan—the only known routes. Joris Spilbergen, in the service of the Company, made the first Dutch passage through the Magellan Strait in his circumnavigation of 1614-16; but just as he initiated the VOC's prowess through the strait, some independent Dutch merchants reasoned that if the Drake-inspired maps were correct and that they could enter the Pacific by circumventing the Magellan Strait altogether, they could argue that they had not violated the Company's monopoly.

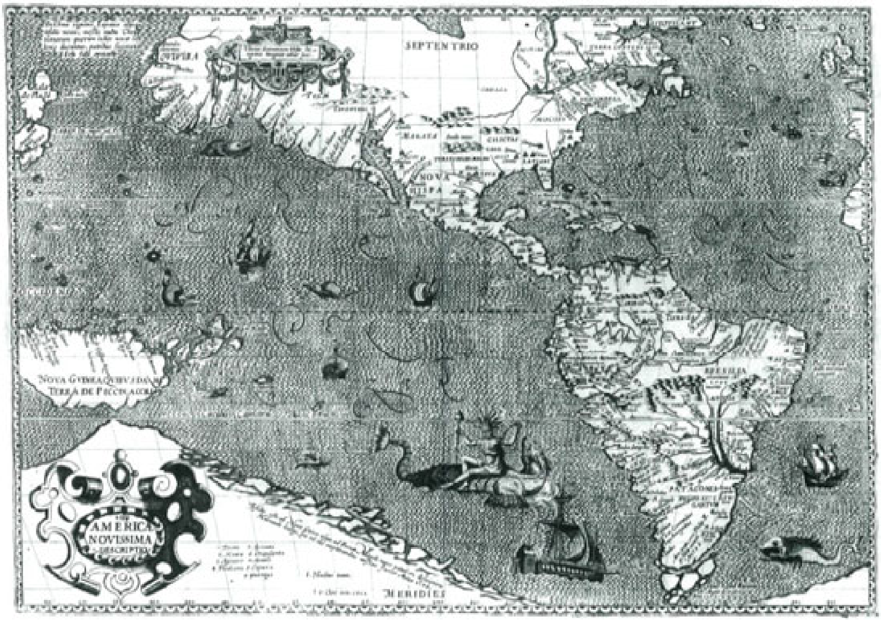

SEPTENTRIO
NOVA HISPANIA
NOVA GVINEA QVIBVSDA TERRA DE PICCINACOLI
AMERICA NOVISSIMA DESCRIPTIO
MERIDIES

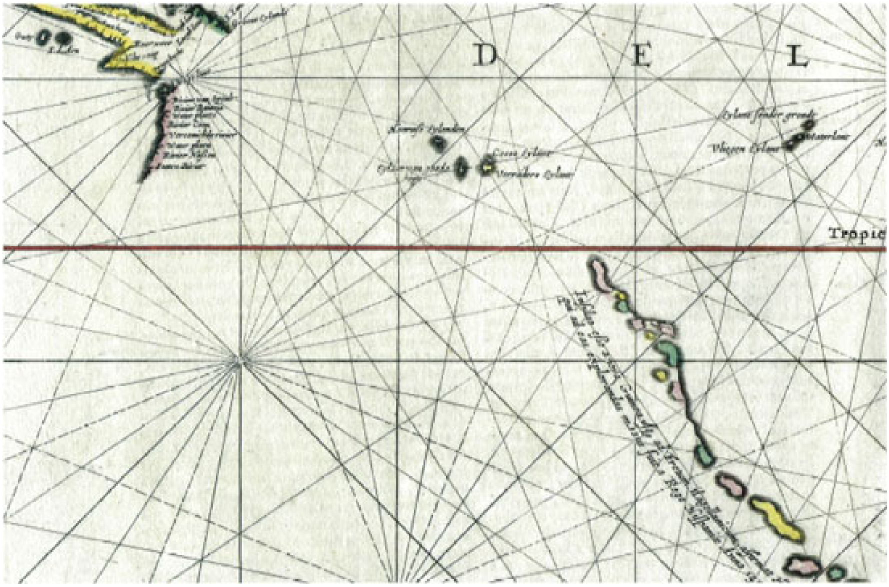
Fig. 83. Pacific Ocean, Jodocus Hondius/Jean le Clerc, 1602. [Martayan Lan, NY]

With this aspiration, in 1615 a group of Dutch merchants sent Jacob Le Maire and Willem Schouten on a mission whose purpose was officially secret, but which business people knew was to enter the Pacific through a new route south of the Strait of Magellan. Their path is marked on a world map recording the tracks of both the Le Maire and Spilbergen voyages, published in 1619 (Fig. 85), and on a map of the South Pacific detailing the voyage (Fig. 81).

In southern South America, one of their two vessels, the *Hoorn,* was destroyed when a fire set to remove weed and barnacles flared out of control. Sailing south of the entrance to the strait in their one remaining vessel, the *Eendracht,* they found a passage between Tierra del Fuego and land to their left, which they named Staaten Land, then continued the maiden rounding of America. To the southernmost tip of Tierra del Fuego, actually the tip of one of many small islands, they gave the name of their lost ship and the Dutch town, the *Hoorn.*

When Sir Robert Dudley, an Englishman exiled in Italy, produced his sea atlas in 1646-7, its large scale required mapping Le Maire's landfalls more explicitly than any other published maps of the day (Fig. 82). Le Maire and Schouten routed themselves up along the coast of Chile toward Juan Fernandez Island, where wind conditions prevented an anchorage, but some water was obtained. Heading west into the open Pacific, after about five weeks, on April 10,1616, they sighted a very low, small island with a lagoon ("so low, in some places, that the sea flows into the middle of the island with the tide"), and despite rough seas tried to reach it, as many of the crew were suffering from scurvy. With the main vessel a safe distance from shore, a boat was sent to fetch provisions. The seas being too rough for the boat to approach near the island, the sailors anchored offshore and swam the rest of the way. They returned, though with great difficulty, having collected "watercresses, which are very bitter to the taste and good for the scurvy." From this and other remarks (they had stopped in Africa and bartered for thousands of lemons when scurvy first began to afflict the crew), it appears that they had some idea of how to prevent scurvy, a century and a half before the physician James Lind and explorer James Cook, who are credited with conquering the disease.

This land they dubbed *Honden* ("Dog Island"), "having seen three Spanish dogs very lean," and determined its position as 15° 12' south latitude. This island may have been Puka Puka, the "unfortunate" island of Magellan.



Above. Fig. 84. Pacific by Jan Jansson, 1650 (detail). The chain of isles in the lower right are the orphaned islands from the Terra Australis of the le Clerc map (Fig. 83). Above it are islands discovered by Le Maire, and New Guinea and the western coast of Carpentaria.

Overleaf. Fig. 86. *Pascaerte vande Zuyd-Zee,* chart of the Pacific from the sea-atlas of Johannes van Loon, a "mathematical practitioner" who had earlier contributed to the pilot books of Jan Jansson (Fig. 84). [Richard B. Arkway, NY]

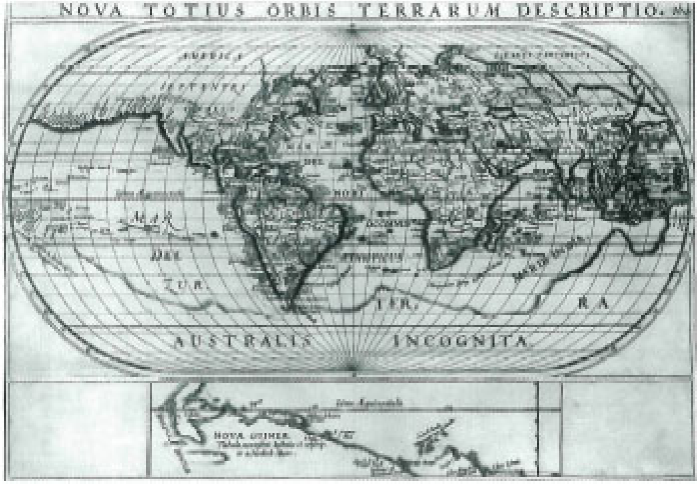
Sailing west four more days, they discovered a larger low island which they placed at about 14° 35 To 15°, where they hoped to get better provisions and fresh water, which Dog Island had lacked. "We sailed toward the said island, and in the evening, about a league from shore, we met a canoe, wherein were four men, quite naked, red colored, having hair long and black." Le Maire found that the islanders "showed themselves covetous, chiefly of iron, so as to want to take the nails out of the ship." Some of the crew went ashore to get supplies, but when two of them were seized by the islanders, muskets were fired, some islanders being shot, the others fleeing. It appeared to the crew that the women "scolded their husbands, as appeared to us, for having behaved so treacherously and barbarously to us." They named the island *Sonder Grondt* ("bottomless island"), "because we could not find in any place soundings proper to anchor." This was probably Takaroa and Takapoto atolls in the Tuamotus.

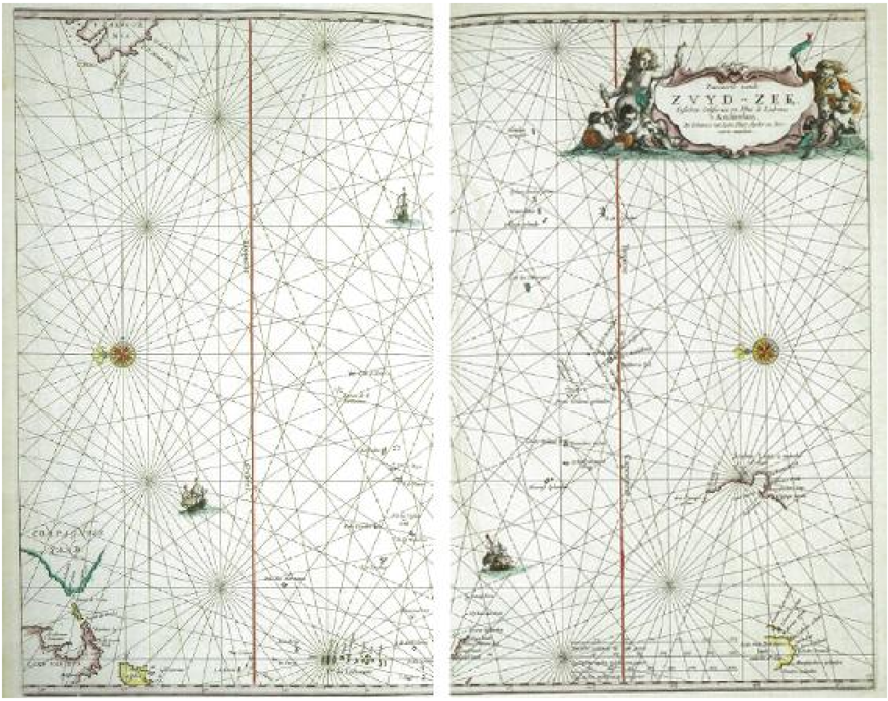
Their next discovery, an uninhabited island, brought them four casks of fresh water, as well as more of the scurvy-fighting cresses they had acquired on Dog Island, and a wealth of crabs and shellfish. Anchoring a boat nearby was impossible "on account of the great surf against the strand," so they remained so far offshore that "the people could not reach the shore but by swimming and hauling one another ashore with ropes, and in like manner aboard the boat," securing four casks of fresh water from a ditch. In gratitude for the much-needed water, they dubbed this island *Waterlandt,* probably the Tuamotuan island of Manihi or Ahe. Latitude was determined to be 14° *46'* south.

Another island with a lagoon was encountered ("within it also is overflowed with salt water")—perhaps Rangiroa. There a plague of flies which kept them distracted for a few days until concerted efforts at killing them, and the arrival of a fresh wind, saw them vanish. The island was named *Vliegen* after the tiny flying scourge. Plentiful rain the next couple of days allowed them to collect fresh water, using the ship's sails and other sheets to trap it.

When a large native vessel was encountered in the open ocean, they fired a shot across its bows, but the islanders knew nothing of European maritime protocol and failed to stop. The Dutch then seized it with the loss of some of its people, and then discovered a pair of islands. Latitude was set at 16° 10' south—they were in the northernmost Tongas. One was "a high mountain, almost exactly of the same figure as one of the Moluccas, full of trees, the greatest part coconuts, for which reason it was named Cocos Island." This was Tafihi. The Cocos Islanders brought the Dutchmen coconuts and supplies, swarming the deck in such numbers and chaos, grabbing everything in sight and attempting to dislodge the iron nails from the ship, that the sailors fired muskets stop them. The islanders laughed at the sailors' musket fire, until one man fell.

Fig. 85. Spilbergen, 1619. Le Maire's tracks to Batavia (enlarged on inset), and Spilbergen's back to Holland, are recorded. [Martayan Lan, NY]


NOVA TOTIUS ORBIS TERRARUM DESCRIPTIO.
AMERICA SEPTENTRI
MAR DEL ZUR
TER RA
AUSTRALIS INCOGNITA
NOVA GUINEA



The other island of the pair, Niuatoputapu, was dubbed *Verraders* (Dudley's *Veriaders Hand*), meaning "Traitors," after a ruse by some islanders to attempt to take the ship. This island is "much longer but lower, and stretches E and W," and is thus depicted by Dudley without a mountain motif.

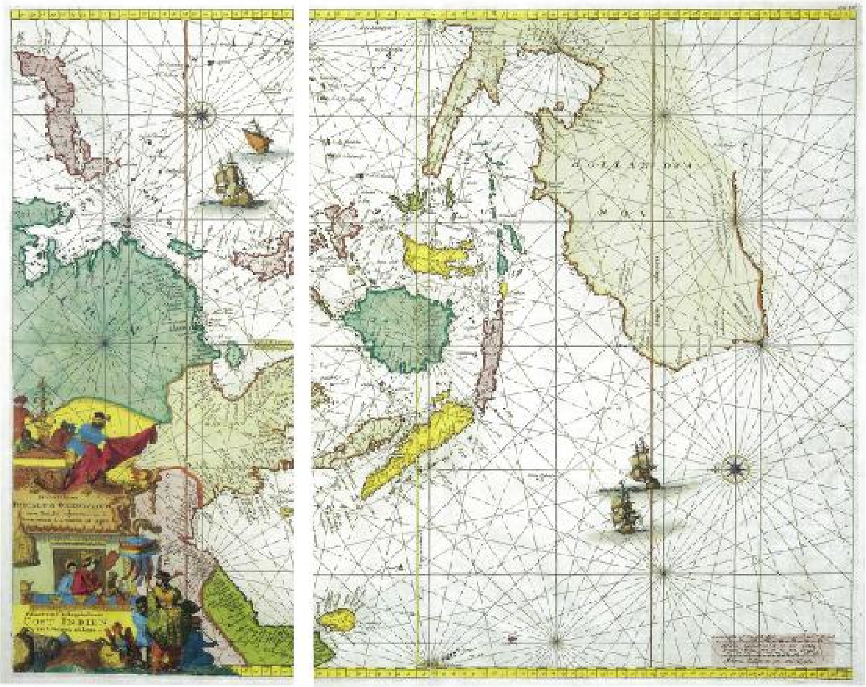
Next they sighted Niuafo'ou, a coast they named "Hope Island" (Dudley's *Hand o IGood Hope),* in anticipation of its yielding "water and better refreshments," but after a skirmish with islanders in fourteen canoes, the company sailed to the southwest, "for there we expected to find the *main land,'* referring to the anticipated southern continent. But after a few days of fruitless sailing, the specter of a contiguous New Guinea and Terra Australis caused Schouten to recommend changing course to the north. Should maps such as that by Ortelius (Fig. 57) prove accurate, they had to be certain to clear New Guinea to the north, else it would be "impossible to return to the east on account of the constant easterly winds which blow in these parts."

Changing course, however, brought them to their most pleasant encounter of the entire circumnavigation. On May 19, 1616, the *Eendracht* reached what they dubbed the Home Islands, Futuna and Alofi, in the northwest of Tonga, due west of Samoa. Here the Dutch enjoyed amicable relations with their hosts, allowing in turn for the visitors' recognition of Pacific culture.

They were surprised at the quality of the islanders' arts. One evening one of the crew "went to fish by moonlight, and having caught some fish, went to the king, where he found a troop of fine young girls, all naked, who danced before the king; one of them played on a hollow piece of wood, like a pump, which gave some sound, whereupon the others danced very excellently, and with a very good grace, to the measure of this playing, so that our people were astonished to see such a thing amongst the savages." The Dutch were baffled "to find that a people so barbarous had so much spirit to be able to observe the cadence and to play on instruments". The expedition was lavished with supplies at the Home Islands, feasting and stocking their vessel with fresh water, hoes, yams, coconuts, and bananas.

From the Home Islands they continued to the west, on June 20 sighting land at 4° 50' south, which was probably Nokumanu, just north of Ontong Java. The islanders had canoes similar to the others Le Maire had seen, but these people "were a little blacker in color," and were the first they had seen in the Pacific with bows and arrows. June 24 brought them to three low islands which "appeared green and full of trees"— hence the Green Islands. The following day, St. John's day, another island was discovered and named after the saint.

Fig. 87. Sea chart of the southwest Pacific by Frederick de Wit, 1680, after the 1666 map of Goos. Except for Tasmania, placed too far south to appear, the map gives a good idea of available published data of Australia.



Le Maire was now willing to risk sailing due west into New Guinea, but the more conservative Schouten again insisted on the safer route to the north. As they sailed, shorelines of New Ireland, the Admiralty Islands, and New Guinea were recorded, though not as individual islands; they knew little of their position other than that the land to their south was what was presumed to be New Guinea.

European contact was regained in Ternate in the Moluccas. Though well received by the Dutch there, when they reached Batavia (Java) in late October 1616, the reception was different. In the place of the heroes' welcome they might have anticipated, their cargo and papers were confiscated by the ruthless new president of the Dutch East India Company, Jan Coen. Le Maire, having just led one of the greatest of Dutch voyages of discovery, was imprisoned for infringing on the Company's monopoly; he was shipped back to Holland with Spilbergen and died en route. Strict secrecy was imposed on the new-found strait, and the publication of maps depicting it was forbidden.

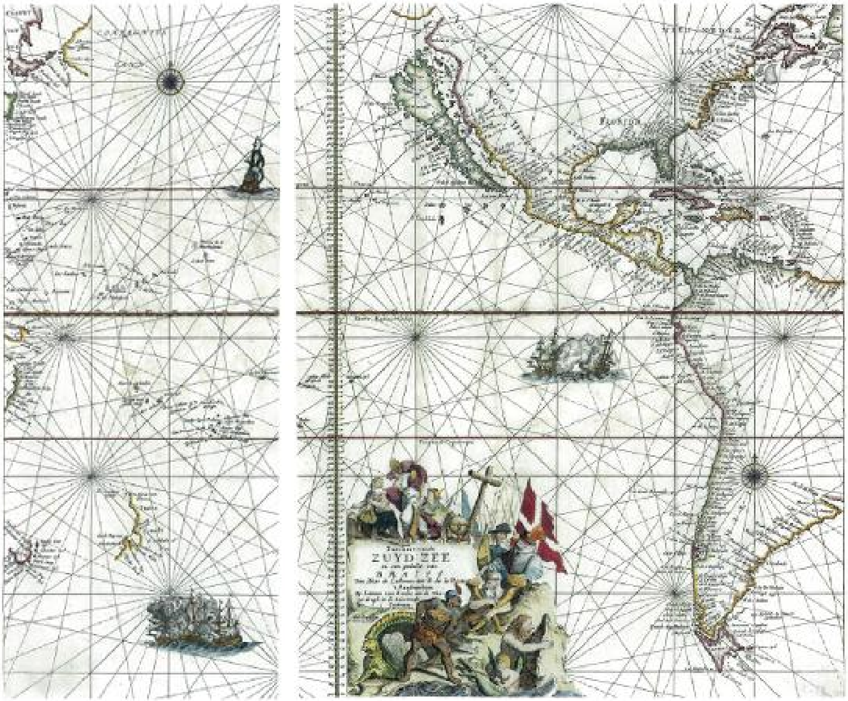
Within a few years, attempts to suppress news of the discovery had proved futile, and Le Maire had posthumously taken his place as a Dutch hero. Hessel Gerritsz's 1622 chart of the Pacific (Fig. 76) flaunts Le Maire's bust alongside those of Balboa and Magellan. One can follow the faint outline of his voyage from the lower right corner, passing just south of the Marquesas (the archipelago immediately to the left of the three vessels off Peru), skirting the Solomon Islands and on to New Ireland and the Admiralties.

When Le Maire proved that Tierra del Fuego was an island, Staaten Land briefly held the torch as substantive proof of the austral continent; but soon that landmass was shown to be even smaller than Tierra del Fuego. Before the enigmatic southern continent was abandoned, however, it was blended together with Hernán Gallego's sentiment that a chain of islands loosely linked the southern latitudes. In 1602, Jodocus Hondius prepared two maps for Jean Le Clerc, one of the world, the other of the Pacific (Fig. 83), both of which fused Gallego's chain of islands into the austral coastline between New Guinea and Tierra del Fuego.

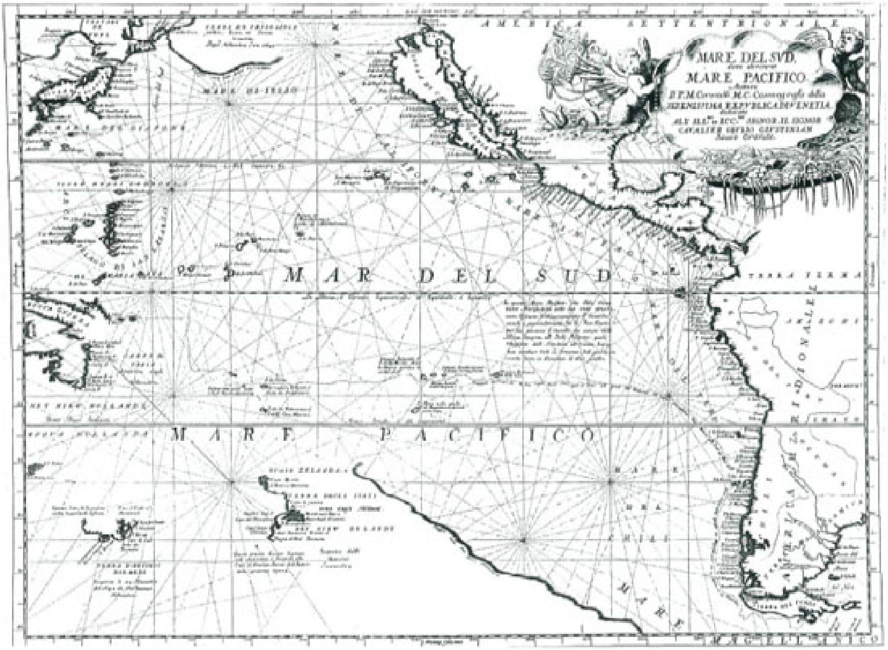
In the next phase, some mapmakers wiped away the austral continent but left the chain of islands intact. This was popularized by Jan Jansson on the map of the Pacific from his sea atlas of 1650 (Fig. 84). The same prototype was adopted by Arnold Colom in 1658 (Fig. 13) and John Seller in 1675 (Fig. 98). Pierre du Val (Fig. 89) integrated it with a Terra Australis coastline that formed the eastern shores of New Zealand. The concept then fell from favor.

Misdating in these maps' legends accompanying this chain of islands has led to erroneous theories of an unrecorded voyage by Gallego; Le Clerc (Fig. 83) records the date as "1570," while Jansson (Fig. 84), Seller (Fig. 98), and du Val (Fig. 89) identify the islands as having been discovered by Gallego in 1576. Although Alexander Dalrymple, writing in 1770, was surely correct in believing these to be simple transcription errors for 1567, the dates have fueled belief that Gallego returned to the South Pacific soon after the discovery of the Solomons, in 1570 and 1576.

Fig. 88. Van Keulen, 1684 (ca. 1700). This sea chart typifies the Dutch published image of the Pacific during this era. The southern Pacific contains the usual two islands of Magellan, along with the various landfalls of Le Maire and Tasman. Discoveries made by the Spanish in the search for Ophir and Terra Australis are forgotten; only the Micronesian islands encountered during the search for westerly winds are shown on the west, along with the few Spanish discoveries closer the California coast which would later be identified, if dubiously so, with Hawaii. [Lahaina Printsellers, Ltd] *Overleaf* Fig. 89. Southern Pacific, Pierre du Val, 1679 (1684). One sheet of a four-sheet world map. [Martayan Lan, NY]

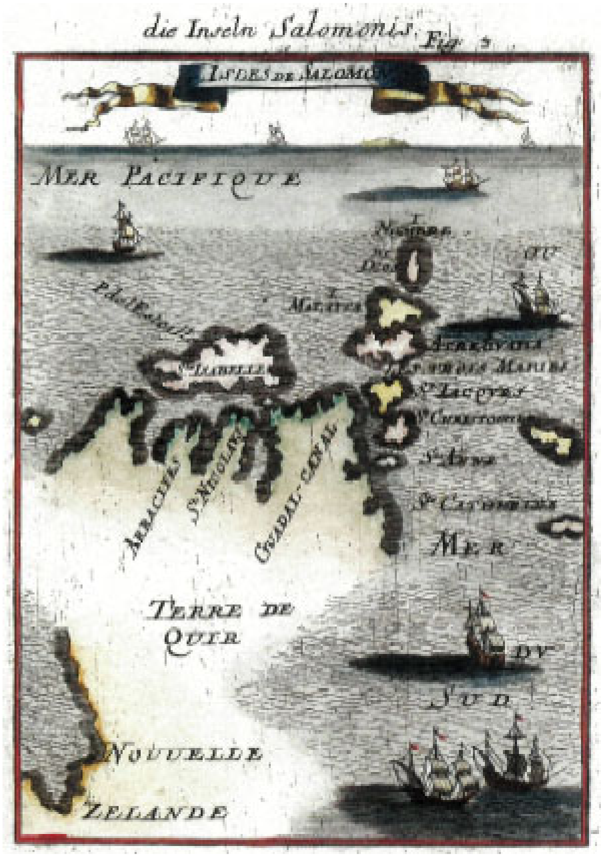

ZUYD ZEE
FLORIDA

AMERIQUE MERIDIONALE
Par P. Du Val Geographe Ord.re du Roy
MER DE NORT
MER PACIFIQUE
Equateur ou Ligne Equinoct.
Tropique de Capric.
MER D SUD
TERRE DE QUIR
AMERIQUE MERIDIONALE
MER MAGELLANIQUE
TERRES ARCTIQUES ou AUSTRALES, MAGELLANIQUES
Cercle Polaire Ant-Arctique
L'AMERIQUE


AMERICA SETTENTRIONALE
MARE DEL SVD
MARE PACIFICO
MAR DEL SUD
MARE PACIFICO
TERRA FIRMA
NOVA ZELANDA
MARE DEL CHILI

Abel Tasman

Whereas the undertaking of Jacob Le Maire and Willem Schouten had been viewed as a threat by the Dutch East India Company, the next great Dutch exploratory voyage, that of Abel Tasman, was a Company effort. He was not the innovator that was Le Maire, yet his Pacific discoveries were more significant, and the voyage for which he is best remembered was only one of several made during his long service with the Company.


die Inseln Salomonis. Fig. 5
ISLES DE SALOMON
MER PACIFIQUE
Nombre de Dios
Malaita
St. Isabelle
St. Jacques
St. Christophe
St. Anne
St. Catherine
ARRACIFES
GUADAL-CANAL
MER DU SUD
TERRE DE QUIR
NOUVELLE ZELANDE

Above: Fig. 90. Pacific Ocean, Coronelli, 1696. Although the "South Sea" appellation was proven meaningless by the mid-sixteenth century, it stubbornly persisted well into the seventeenth, many mapmakers using it alongside "Pacific"; even today, "South Seas" is understood as a euphemism for the tropical Pacific. The Pacific between the equator and the Tropic of Capricorn is almost exclusively the realm of Le Maire's discoveries. To the northwest, the new name *Di Maria Ana* marks the Marianas, in addition to Magellan's old terms *Ladroni* and *San Lazaro,* the latter having originally designated the Philippines. [Martayan Lan, NY] *Left:* Fig. 91. A reasoned, but erroneous attempt to make sense of discoveries in New Zealand, the Solomon Islands, and Vanuatu. Allain Mallet, 1683.

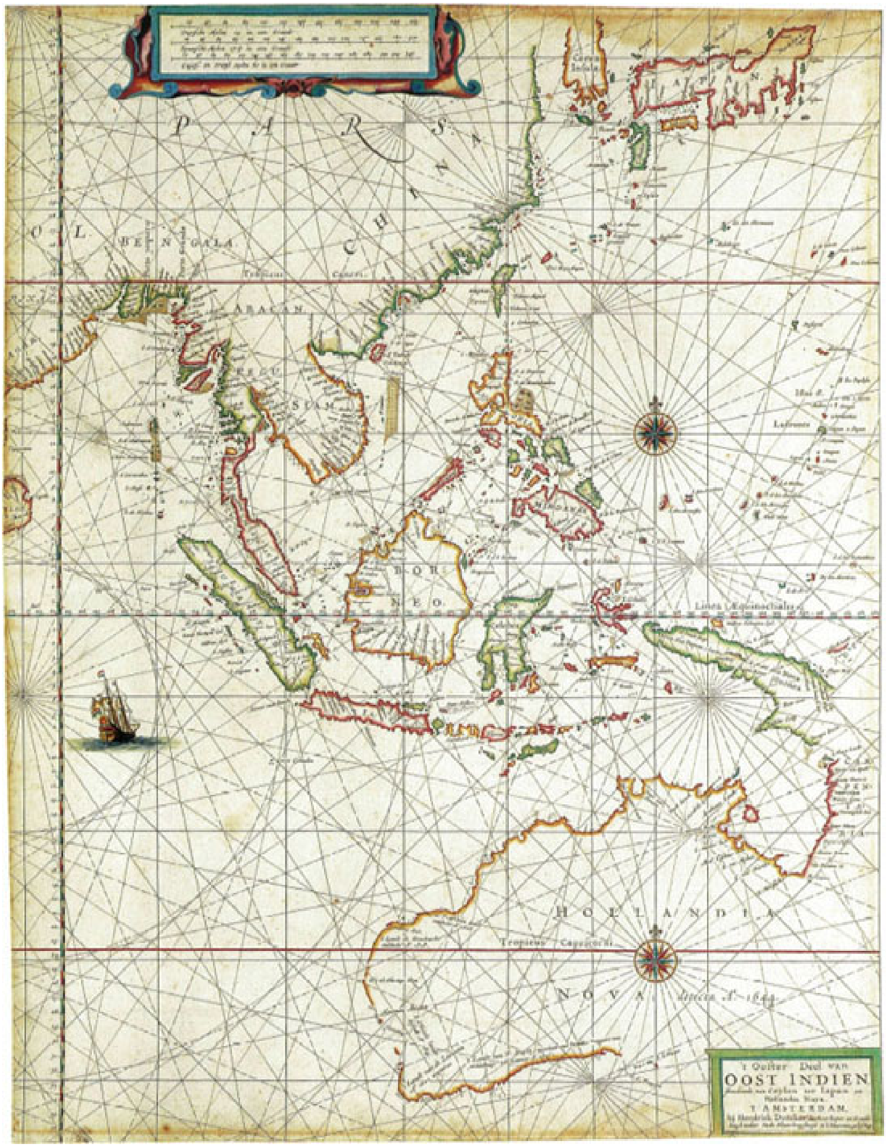
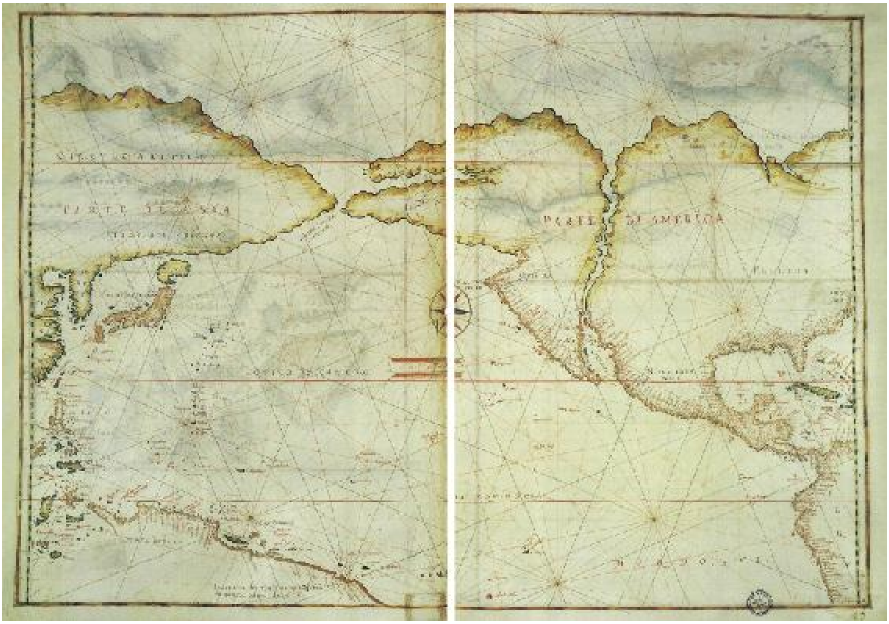

P A R S
C H I N A
BENGALA
ARACAN
SIAM
BOR NEO
Linea Æquinoctialis
H O L L A N D I A
Tropicus Capricorni
N O V A
't Ooster Deel van
OOST INDIEN
t'AMSTERDAM.
By Hendrick Doncker

Fig. 92. Sea chart of the western Pacific, Hendrick Doncker, ca. 1660.

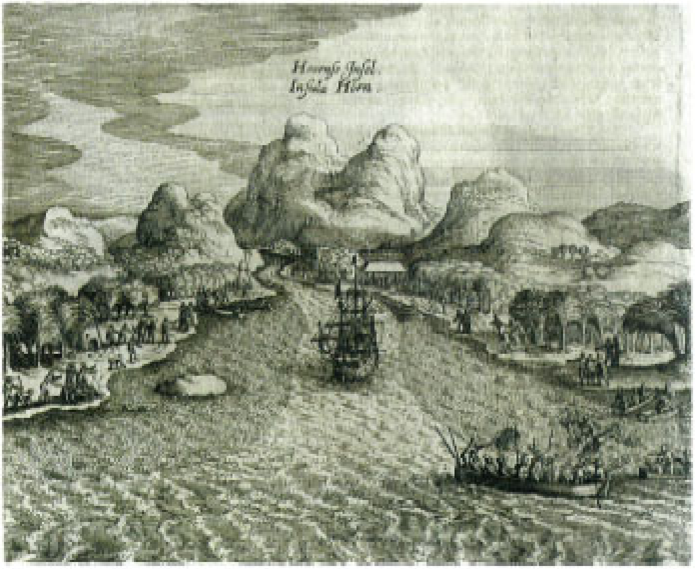


With tidbits of first-hand sightings of the "Southland" below New Guinea, and a clearer image of western Australia emerging from encounters by Dutch pilots overshooting their eastward trek across the Indian Ocean en route to Batavia, Abel Tasman was charged by Anthony van Diemen, Governor-General of Batavia, with the task of "finding the remaining unknown part of the terrestrial globe." The strategy, simply put, was to make a wide counter-clockwise reconnaissance around the southwest Pacific, sailing first west and south in the Indian Ocean. The southern leg of the journey was to definitively establish whether the Southland was part of an austral continent, and the northern, return segment to search for the Solomon Islands and replicate the course of Le Maire, a chart of whose he carried onboard.

In August 1642, Tasman left Batavia and sailed west to Mauritius, then south, then east. Along the eastward trek he encountered a land which he named for van Diemen, but which subsequently was renamed for him (Tasmania). They did not follow the coast northward to determine its extent or continuity with the Southland, and never saw the land's people, though they saw evidence that the land was inhabited.

Continuing eastward, on December 13 Tasman "had sight of a very lofty and mountainous country to the SE." To the northeast, "a spacious bay, three or four miles in breadth" was found where they saw "men of a thick set robust make, and very rough voices." Tasman had just effected the European discovery of New Zealand, which he named *Staeten Landt.* The natives "several times blew an instrument which had something of the sound of a trumpet," in answer to which Tasman had his own trumpeter reply. The people seemed to be "disposed to a friendly intercourse," and when they approached Tasman's vessels, white linen was waved in friendship, and a futile attempt was made to communicate with them using vocabulary of the "Solomon" (Home?) Islands. The Maoris were hostile, however, and four of the Dutch crew were killed. Tasman dubbed the place "Murderers Bay."

Previous pages: Fig. 93. This anonymous chart is unusual for its interpretation of the Gulf of California, forming a straight highway to open northern seas, reflecting the hope—or fear, depending on who commands it—of a quick, easy route between the Pacific and Europe. The Solomon Islands are here envisioned just off the coast of a greater New Guinea—Terra Australis landmass. Teixeira school, ca. 1632. [Biblioteca Nacional, Rio de Janeiro] *Belour.*
Fig. 94. Le Maire's vessel approaching the Home Islands (Wallis and Futuna) in 1616. (Gottfried, 1640).



Sailing on to the northeast, Tasman now added some southern members of the Tongan archipelago to the map—*Hooge Pylestert* (Pylstaart or Ata), *Moddleburgh* (Middelburg or 'Eua), *Amsterdam* (Tongatapu), and *Rotterdam* (Nomuka). Next he became the first known European to enter Fijian waters, naming the group Prince William's Islands.

The first printed map devoted exclusively to the islands of the Pacific, rather than the entire ocean and its defining continental coastlines, is the 1661 *Pascaerte vande Zuyd-Zee* from the sea-atlas of Johannes van Loon (Fig. 86). Oriented with east at the top, the map's three prominent vertical lines are the equator (center), Tropic of Cancer (left), and Tropic of Capricorn (right).

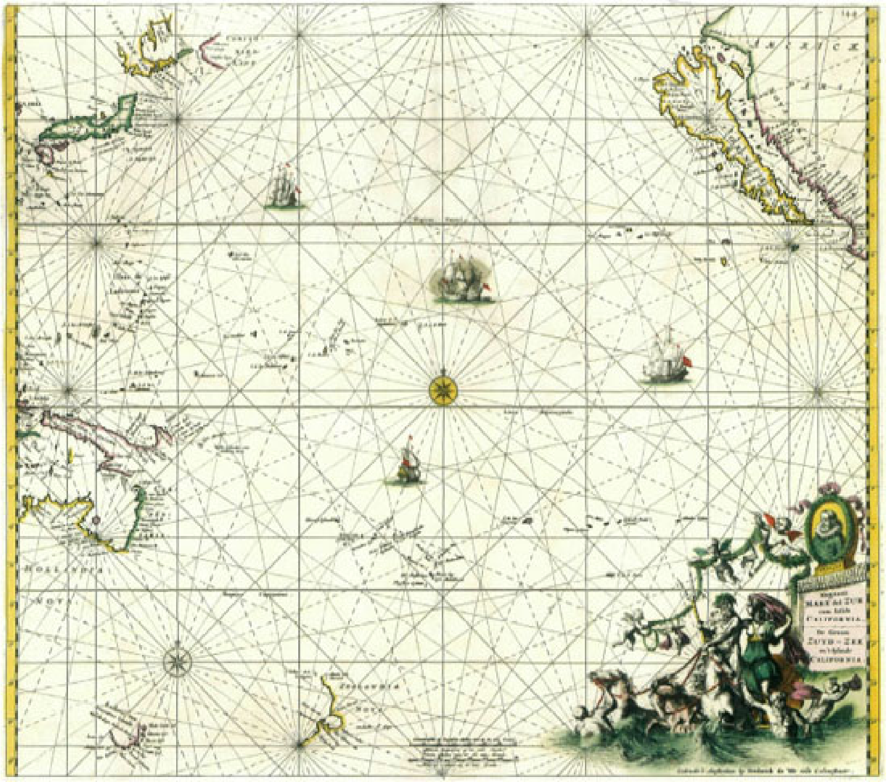
These lines, coincidentally, compartmentalize Pacific discoveries into historical groups. To the south (right) of the Tropic of Capricorn lie only Tasman's discoveries in Tasmania and New Zealand; between the Tropic of Capricorn and the equator lay principally those islands discovered by Le Maire and by Tasman, along with the inevitable *I. de S. Petro* and *I. de los*

Tiburones from Magellan; and the islands lying between the equator and Tropic of Cancer are those derived from the various Spanish voyages of the sixteenth century: *Miracomo Vaz, Salteadores, Vesinos, Barbudos, Iardines, Corales, Reys,* and *Nadadores* (see Chapter 10 for identifications). Notably absent are the Solomons, or any trace of the voyages of Quiros or Mendana. The van Loon map was copied by Peter Goos five years later, turned around so that west is at the top.

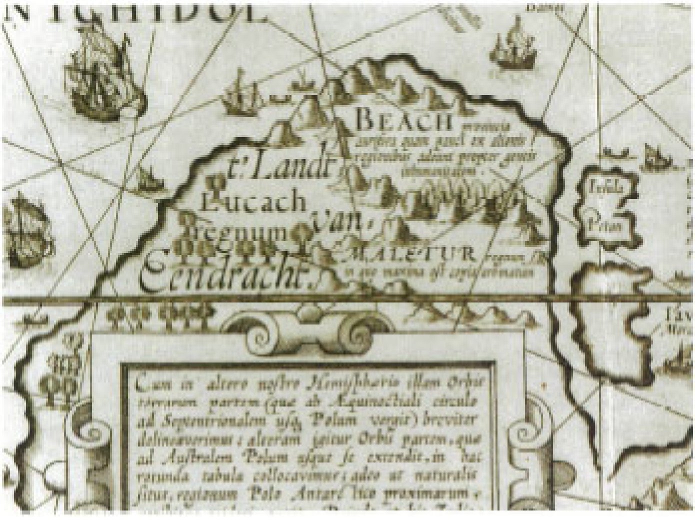
Other Dutch charts recycle essentially the same Oceania data, differing markedly in presentation but little in content. French geographers of the same period, however, relied less on the Dutch formula, poring through data and finding new ways to make it into a coherent whole.

Whereas van Loon's chart records only what was known of Le Maire's discoveries, Mallet's *Isles de Salomon* tries to interpret them (Fig. 91). Mallet attempts to correlate the landfalls of Quiros and Mendana to Tasman's discoveries and to the question of an austral continent. Tasman's discoveries in New Zealand, the solid coast in the lower left, and Mendafia's discoveries in the Solomon Islands, the series of sharply angled coasts in the middle, are shown as being possibly contiguous. Since New Zealand was unknown on the north, the Solomons unknown on the south, and since Mendana had underestimated the Solomons' distance from Peru (thus offsetting them to the east), this was not an unreasonable hypothesis about two lands which in truth lie about 3000 kilometers apart. The shores discovered by Quiros in 1605-6 serve as the amorphous void linking them (*Terre de Quir*). At the top is the horizon, as though the map placed the viewer at a 45° angle above the earth. Such an "aerial" perspective had been commonly used in city views since the sixteenth century, but was a novelty in maps.

Du Val also associates Quiros's landfall with New Zealand (Fig. 89), and adds to it the austral continent identified with Gallego's discoveries in 1576, complete with the chain of islands dotting its coast. The Venetian cartographer Vincenzo Coronelli (Fig. 90) offers a more advanced depiction of northern Australia and a more reserved interpretation of the southern Pacific. The western shores of New Zealand that Tasman skirted are shown without emendation, but the vestige of a Terra Australis to the east coast leads the eye to assume that New Zealand is part of some large austral land. Tasmania lies by itself, with only a trace of the southern Australian coast shown.



Above. Fig. 95. Pacific Ocean from the sea-atlas of Frederick de Wit, 1680. In 1745, the Solomon Islands and Quiros's "Land of the Holy Ghost" were added to the map. *Belour.* Fig. 96. Northern promontory of Terra Australis comprising Dutch discoveries in Australia (t'Landt Eendracht), Marco Polo's Southeast Asian kingdoms of Maletur and Lucach, and "Beach", a transcription error of Lucach. Detail from a map by Hendrik van Langren, ca. 1599 (ca. 1625). [Gowrie Galleries]


BEACH provincia
t'Landt
Lucach
Regnum
van
Eendracht
MALETUR regnum
Insula
Petan
Cum in altero nostro Hemisphaerio illam Orbis
terrarum partem (quae ab Aequinoctiali circulo
ad Septentrionalem usq. Polum vergit) breviter
delineaverimus: alteram igitur Orbis partem, quae
ad Australem Polum usque se extendit, in hac
rotunda tabula collocavimus: adeo ut naturalis
situs, regionum Polo Antarc. tico proximarum

Of the several publishers of sea-atlases in Amsterdam during the latter part of the seventeenth century, Hendrick Doncker (Fig. 92) put the most effort into improving his charts as better data became available from the many Dutch voyages that added incrementally to the mapping of the Australian coastline. The principal remaining gap, the east coast through the upper portion of the Cape York Peninsula, would not be remedied until the first voyage of Cook. Some of the other unknowns, such as the southwest coast near what is now Perth and much of the southern coast, would have to wait to the turn of the nineteenth century, and the Australian interior challenged surveyors through the turn of the twentieth.

CARTE DE LA MER DU SUD
ET DES COSTES D'AMERQUE ET D'ASIE, SITUEES SUR CETTE MER
MER DU SUD
Tropique
du
MER
DU
NOUVELLE HOLLANDE

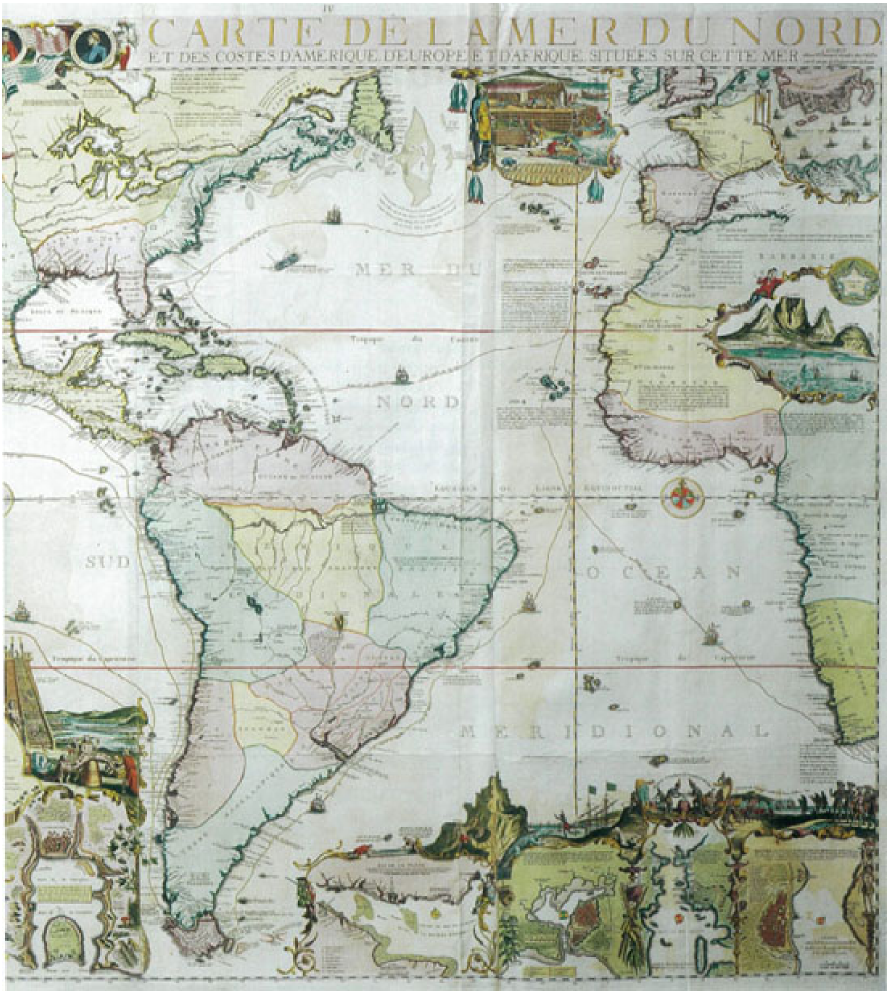

CARTE DE LA MER DU NORD
ET DES COSTES DAMERIQUE, DEUROPE ET DAFRIQUE, SITUEES SUR CETTE MER
MER DU
NORD
SUD
Tropique du Cancer
Tropique du Capricorne
OCEAN
MERIDIONAL

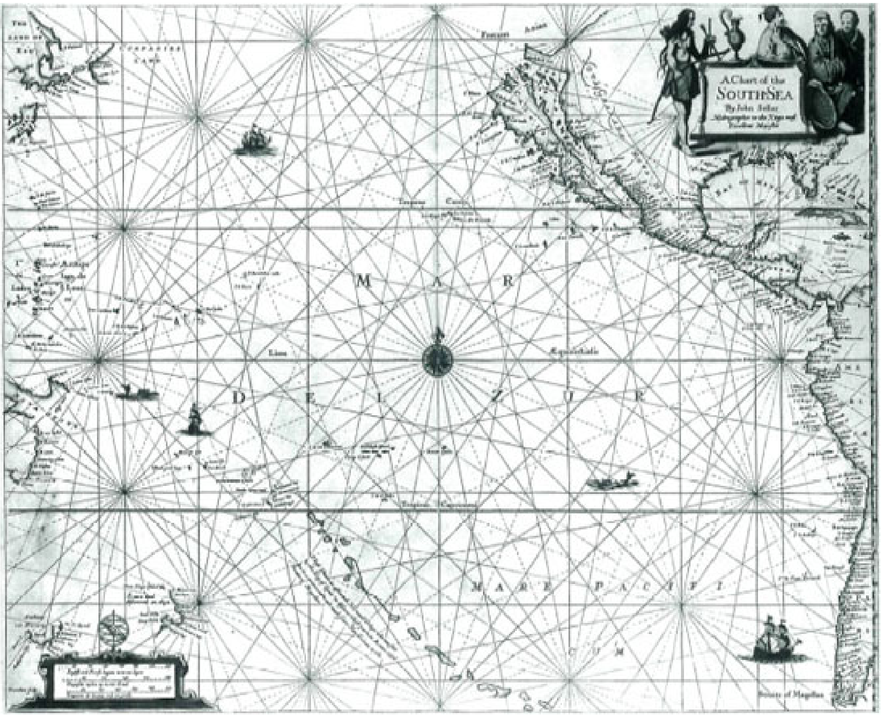
Fig. 97. *Carte de la Mer du Sud,* Nicolas de Fer, 1713. The most lavish map of the Pacific published on the eve of the great exploratory voyages of the eighteenth century is this work of Nicolas de Fer, 1713. Although separately published, a copy was included in the *Atlas Historique* of Henri Chatelain six years later, in which form it was widely disseminated. De Fer has displaced the mischievous Solomons so far to the east that they lie east of northern California. Here the relative individuality of French mapmakers, compared with the uniformity of the Dutch makers who avoided such contentious shores, is evident: de Fer's countryman, Pierre du Val, had three and a half decades earlier (Fig. 89) placed the Solomons virtually contiguous with New Guinea, a difference of opinion of about 10000 kilometers. Cluttered vignettes shield de Fer from having to make any guesses as to the relationship between New Zealand and an austral continent, or between Tasmania and Australia. Just to the southeast of New Guinea are the shores discovered by Quiros, which de Fer infers might be the eastern end of Carpentaria. Above New Guinea, de Fer tapped the map of Father Klein (Fig. 179) which attempted to chart the "undiscovered" Carolines with data gleaned from islanders. [Martayan Lan, NY]

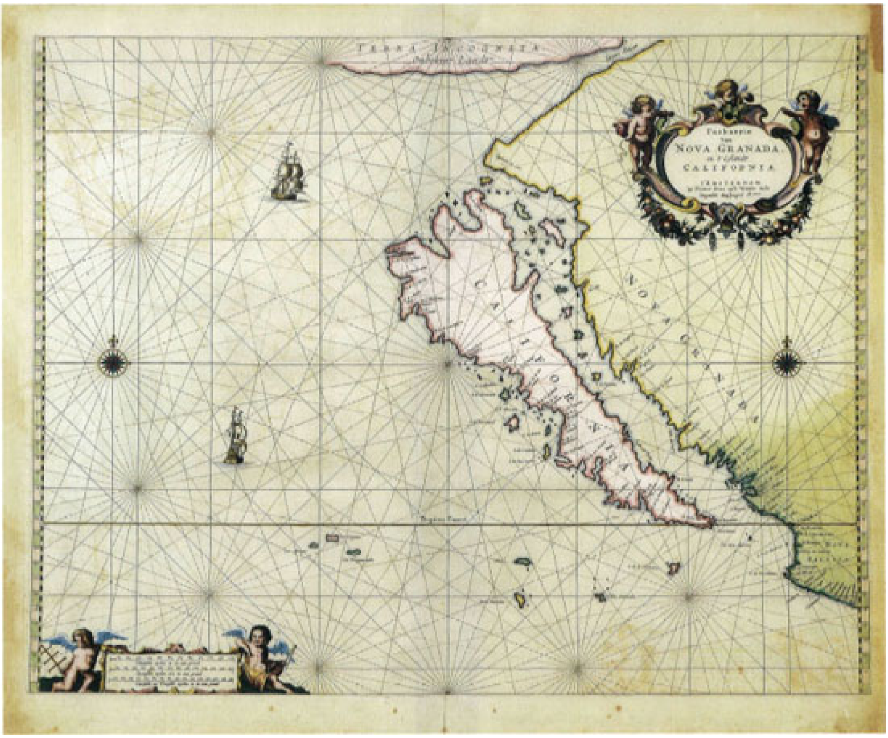
Chapter 6

The Age of Enlightenment

Following the voyage of Tasman, the mapping of central and eastern Oceania began an eight-decade hiatus. There was, however, one new, large island added to the eastern Pacific during this time: California. From its published beginnings on two title pages in 1622, this fallacy was almost universally accepted during the second half of the seventeenth century. Ironically, maps published during this time that depicted California correctly as a peninsula (for example, Fig. 52) did so because they were "antiquated," engraved earlier in the century or copied from such maps, not because their makers had an opposing opinion on the matter.

To see how California became a Pacific island, we need to look back to Hernan Cortes and his discovery of lower California in the 1530s. Cortes, who had probably expected to encounter any of the islands he imagined coddled in a gulf between America and Asia, sent Francisco de Ulloa to investigate the discovery. Ulloa determined it to be a continental peninsula, and the accuracy of the Gulf of California on some mid-sixteenth maps suggests that some Spanish pilot may have sailed the full gulf by then. But when Francis Drake circumnavigated the world in 1577-80, Spanish authorities feared the English might discover a secret route through the California Sea and above North America, dramatically shortening the trip between the Pacific Coast and Europe. Since such a route could threaten Spain's entire American empire, the strait was sought by the Spanish so that it could be exploited and fortified before their rivals did so. The myth of California as an island was borne from a 1602 expedition sent to explore the California coast under Sebastian Vizcaino. According to an account of the voyage by Father Antonio de la Ascension, California was separate from the main of North America.


A Chart of the
SOUTH SEA
By John Seller
M A R
D E L
Z U R
M A R E   P A C I F I
Straits of Magellan


TERRA INCOGNITA
Paskaerte van
NOVA GRANADA,
en t'Eylandt
CALIFORNIA
CALIFORNIA
NOVA GRANADA

Opposite. Fig. 98. Pacific Ocean, John Seller, 1675. Seller appears to have worked from the Jansson map of 1650 (detail, Fig. 84), adding to it the discoveries of Tasman and modifying the island of California to follow later models, such as that of Goos, above. [Library of Congress] *Above.* Fig. 99. Island of California, Peter Goos, 1666. Below California, the islands *I. De S. Thomas, Roca Partida, Ihla,* and *Ambladaare* are from the voyage of Ruy Lopez de Villalobos. [Martayan Lan, NY]

One Iberian geographer envisioned the most alarming possibility when composing the chart shown in Fig. 93—a literal interpretation of the Gulf of California forming a clear strait to the Arctic seas and an easy route over North America to Europe. This interpretation was rare; conventional maps, such as that by Peter Goos (Fig. 99), simply detach California, making the strait a shortcut to the northern Pacific but not a means to circumvent the continent. Not until a 1701 map of Father Eusebio Francisco Kino, who had been convinced by circumstantial evidence that California was part of the mainland, did mainstream mapmakers begin to revert back to a peninsular configuration, and not until 1746, when Father Ferdinando Consag led an expedition to the mouth of the Colorado River, was the matter officially settled.

California was still widely accepted to be an island in Mexico in 1727, when Mendoza y Gonzalez's map (Fig. 100), the first of the Pacific published in the New World, was printed. The crude engraving accompanied a treatise recording an eclipse of the sun of March 22 of that year, explaining how longitude might be calculated using the path of such an eclipse.

The map's vertical lines represent hours of the eclipse's path rather than degrees, with the westernmost point, *saliendo el sol* ("the leaving of the sun") passing through New Guinea. East of that is the path of the sun during *maxima obscuracion naciendo el sol* ("maximum darkening of the rising sun"), which occurs over the Solomon Islands, and *Quiri,* a single large island representing Quiros's discoveries. The only other island identified in the Pacific is *Nadadores* ("the swimmers'), north of New Guinea, discovered in 1565 by Alonso de Arellano of the Legazpi expedition. It is revealing of the often haphazard nature of early Pacific mapping that this island, probably the small atoll of Lib near Kwajalein, should be the one north Pacific island identified aside from California.

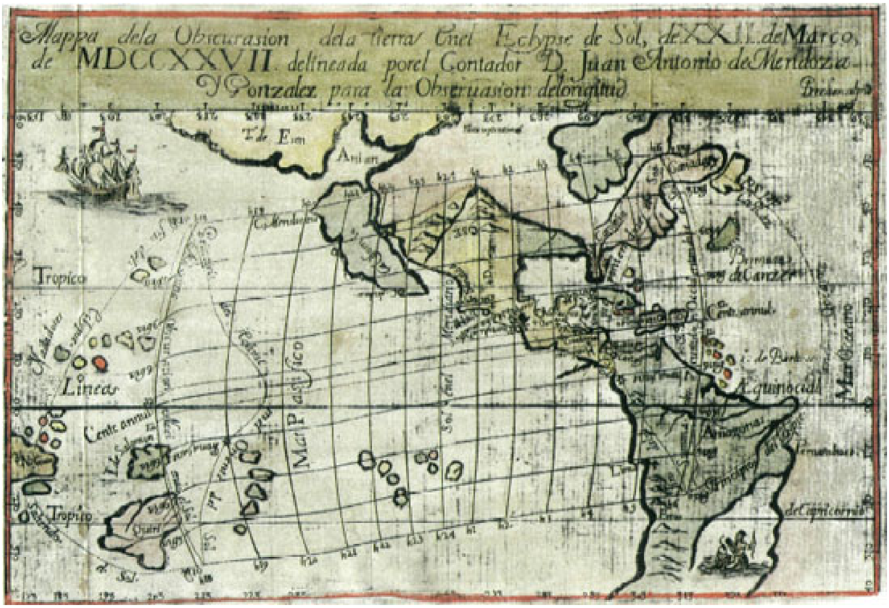

Mappa dela Obscurasion dela tierra en el Eclypse de Sol, de XXII. de Marco, de MDCCXXVII. delineada porel Contador D. Juan Antonio de Mendoza y Gonzalez para la Obseruasion delongitud
Tropico
Linea
Mar Pacifico
Anian
Equinocial
Amazonas
Tropico de Capricornio

Fig. 100. Pacific Ocean by Juan Antonio de Mendoza y Gonzalez, printed in Mexico in 1727. The small book refers frequently to the map to explain its premises. Lengthy explanations ask the reader to, for example, "refer to the map … and find the place in the Equinoctial in 203 gr. of longitude, and I find myself with a ship south of Acapulco, and see, that at 2:30 PM the moon touches the side of the ship, or southern edge of the sun…."

The English Map Trade

Holland's endeavors in the Pacific were essentially commercial, its exploration methodical and deliberate. The earlier, dream-driven ventures of the Spanish had cost dearly and added precious little of economic justification to the map. During the seventeenth century, whereas Holland's incremental exploration of Australia, neighboring to its Indies empire, made practical sense, blind reconnaissance through far-flung ocean did not.

The East India Company (VOC) did boast increasingly refined charts of Australia and of the Indonesian islands upon which their trade was dependent. Although the Company had since its beginnings prohibited the publication of these charts, an officer would occasionally "lose" one when offered cash by an outsider, and some wealthy Dutch individuals were given copies of charts with the trust, not always honored, that they be for their personal reference only. In the early eighteenth century, with VOC supremacy in the Indies waning and its ability to maintain secrecy undermined, makers of published maps began to draw on its archives. The Van Keulen firm, and former Company employee Francois Valentijn (Fig. 102), were among the first to do so.

The Low Countries had become the masters of the printed map trade with the publication of Ortelius's *Theatrum* in 1570 in Antwerp, the center of the trade shifting to Amsterdam at the turn of the seventeenth century with the entry of such publishers as Blaeu, Hondius, and Jansson. Printed sea-atlases of the world were first published about 1650, most with a general chart of the Pacific, such as those by Jansson (1650, Fig. 84), van Loon (1661, Fig. 86), de Wit (1680, Figs. 87 and 95), and Van Keulen (1684, Fig. 88). Most of these charts are geographically closely related, depicting the same data in similar conception despite their differences in presentation and orientation. Such general charts veiled their ignorance of the shape of individual islands because the small scale rendered them mere dots. Large-scale charts of Oceania were impractical until the latter eighteenth century, the charts of Robert Dudley (for example, Fig. 82) being among the few to attempt to extrapolate an island's rudimentary outlines from the scant evidence available.

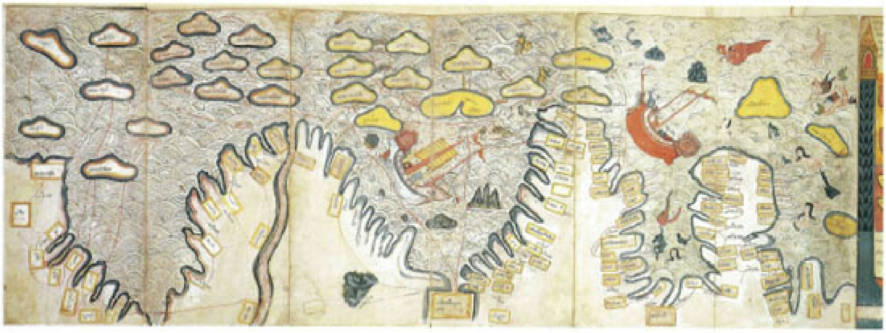


Fig. 101. A Thai map accompanying the *Traiphum* ("three worlds"), a Theravada Buddhist cosmology and cosmography. The map dates from 1776, the Thonburi period, after the pillaging of Ayuthaya by Burma in 1767 and before the court relocated to Bangkok. Clearly influenced by Western maps, it stretches from Japan to India, with east and south at the top. Orientation and scale are wildly inconsistent. [Staatliche Museen zu Berlin-Preufiischer Kulturbesitz Museum fur Indische Kunst]

England produced little of Pacific interest during the first three-quarters of the seventeenth century. Gabriel Tatton's published map of 1600 (Fig. 64) had quickly became dated with the voyages of Le Maire and Tasman, and when John Speed produced a general atlas of the world in 1627, its coverage of the Pacific was limited to maps of the world and America. These repeated the data of Dutch maps, as did a map of Southeast Asia added in 1676.

John Seller, an instrument maker and teacher of navigation, produced the first English printed sea-atlas in about 1675. Despite Seller's claims that his charts drew from "the latest and best discoveries, that have been made by diverse able and experienced navigators, of our English nation," his map of the Pacific (Fig. 98) owed its data to Dutch prototypes.

Seller's financial woes led to his collaboration with two other chartmakers, William Fisher and John Thornton, and ultimately to a new atlas, *The English Pilot,* which became the standard printed sea-atlas for English commercial vessels for much of the eighteenth century. As with the Dutch atlases of the period, this atlas impacted the mapping of the Asian islands of the Pacific, but not of still-reclusive Oceania.

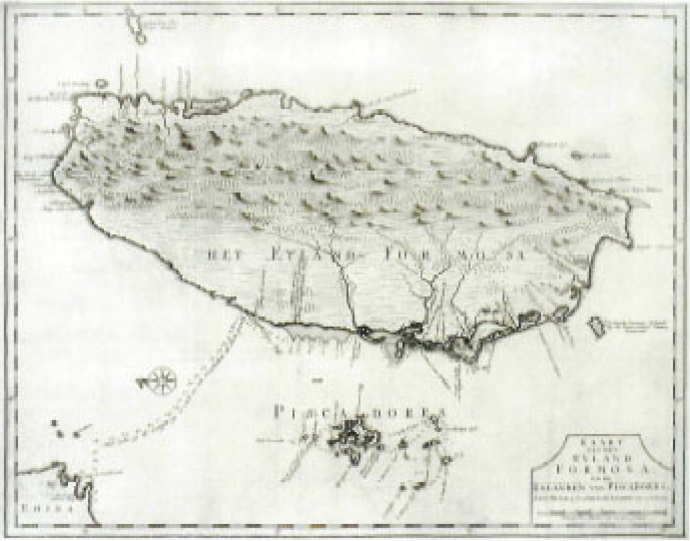


Fig. 102. Taiwan, from Francois Valentijns *OudenNieuw Oost-Indien* (1724-6).

Seller's printed sea-atlas had to compete with an existing, prolific community of makers of manuscript charts in England, loosely referred to as the "Thames School." These manuscript works tended to reflect a bit more independence from Dutch prototypes than the printed newcomers. Among their most prodigious makers was William Hack, who became noted for large-scale atlases of the Eastern navigation, containing charts of the western Pacific such as that illustrated in Fig. 103 of part of the Philippines.

But England's major contributions to Pacific mapping began with the theoretical and thematic. At about the same time Seller set the stage for the English printed sea-atlas, the English scientist Edmund Halley set about mapping such non-geographic data as winds and magnetic variation.

Scientists and Buccaneers

Halley was deprived by chance of birth from the cosmographic endeavor most dear to him, in which the Pacific would have played an important role—observing a "transit of Venus," that is, witnessing the path of the planet Venus across the sun. Since the earth rotates, the apparent speed of Venus's path across the sun would vary according to one's position; thus it was theorized that if the transit could be accurately timed at several points, one could use the differences to calculate the distance to the sun, and even afford, according to a theory of Kepler, an understanding of the size of the universe itself. Such a transit had occurred in 1639, before Halley's birth, and would not occur again until 1761.

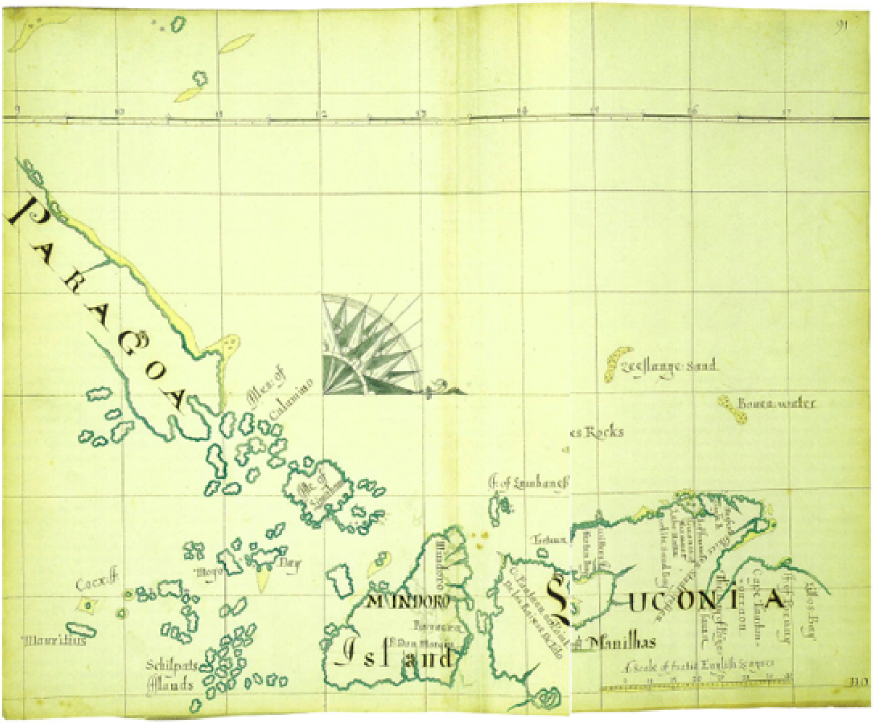


Fig. 103. Palawan, Mindoro, Luzon, and intervening islands, from a manuscript atlas of William Hack, London, ca. 1690. The map is oriented with east at the top. [Library of Congress]

Halley became intrigued with the idea when recording a transit of Mercury on Saint Helena in 1677. Mercury's parallax was inadequate for the experiment, but Venus was larger and closer. "We therefore recommend again and again," he implored in an article in the *Philosophical Transactions* of 1716, "to the curious investigators of the stars to whom, when our lives are over, these observations are entrusted," that the transit be carefully recorded. But when the day came, the efforts of observers in Europe, Asia, Africa, and Newfoundland were ruined by clouds, wars, and Venus's skimming too close to the edge of the sun.

But transits of Venus occur in close pairs, and thus the second transit in that cycle, which would be on June 3, 1769, was now all the more significant. Responsibility for measuring the transit from Oceania would fall to James Cook on his first Pacific voyage. We will return to this posthumous influence of Halley and new-found significance of the Pacific in Chapter 8.

No such cosmic timetable delayed Halley's contributions to terrestrial mapping. In 1686, he published a map of the trade winds in the *Philosophical Transactions,* which included data in the western Pacific. Two Atlantic voyages of 1698 and 1700 enabled him to record compass variation, and his first "isogonic" map recording his readings (1701) was limited to that ocean, but in 1702 he extended his chart to the western Pacific using data, according to text accompanying his chart, "collected from the comparison of several journals of voyages lately made in the Indian Seas." The sum of his research was published in a world map by Reinier and Joshua Ottens (Fig. 104), showing winds and magnetic variation through the Indian and Pacific oceans, drawing on data principally from Halley's countryman, William Dampier.

Dampier's recording of meteorological and other non-geographic information tapped by Halley, his inquisitive nature, and fastidious attention to details of indigenous peoples and their environments, foreshadowed the scientific expeditions of the eighteenth century. He made four voyages to the Pacific: the first an east-west crossing in the course of his adventures as a buccaneer; the second an official voyage to the southwest Pacific, via Africa, won with the clout garnered from the printed account of his buccaneer days; and the third and fourth east-west crossings on private plundering enterprises, the last as pilot under Woodes Rogers. Of these four voyages, the first helped add so-called Davis Land to the Pacific map; the second, the only voyage which was not a circumnavigation, contributed to the mapping of Australia, eastern Indonesia, and the Melanesian islands near New Guinea; and the remaining two voyages added nothing to Pacific cartography, but inadvertently placed the Pacific on the literary "map."

Dampier's account of his adventures as a buccaneer, *A New Voyage Round the World,* reached bookshops in 1697. In it he discusses conflicting Spanish and English figures for the breadth of the crossing from America to Guam, and notes that only once during their own crossing did they see any fish, which was when they were in the vicinity of rocks indicated on their charts, but not seen. A two-page chart correlated various coordinates in his trans-Pacific sail to winds at those positions. The volume began with a world map by Hermann Moll, which depicts a little diagonal trace of land in the southeast Pacific that had been reported by his buccaneer friend Edward Davis; over the decades that followed, the scant line would take many an explorer on a wild chase.

Dampier's second voyage, the official scientific expedition, could have proven a watershed event had he been allowed to follow his own ambitious plans for intensive exploration of Australia, and had his abilities as a commander been equal to those of his seamanship. With one unworthy vessel and a small crew of largely incompetent sailors, he sailed to western and northern Australia, continuing along northern New Guinea, which like most of his contemporaries he presumed to be part of Australia.

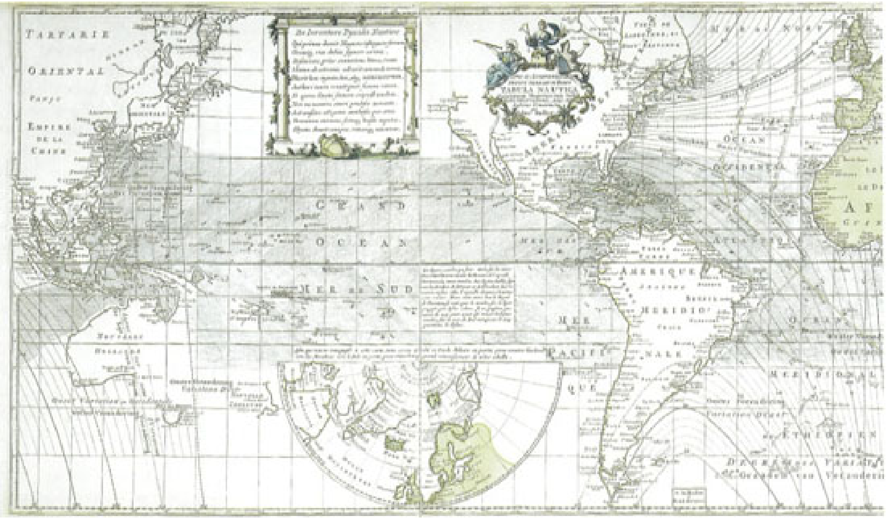


Fig. 104. Halley's map recording winds and magnetic variation, Ottens, 1740. [Martayan Lan, NY]

The voyage's most significant changes to the prevailing map were in the Bismarck Archipelago. After rounding the western New Guinea coast to the north, Dampier turned east, out of sight of land until reaching New Hanover, in the northern Bismarcks. He sailed south along the eastern shores of New Hanover and New Ireland, believing that these were parts of New Guinea, and when he reached a gap in the shoreline, he believed it to be a bay and named it St. George's, though this was actually the strait separating New Ireland from New Britain. The next strait to the south, that separating New Britain from Umboi Island, he found and sailed through; but he supposed Umboi to be part of New Guinea, and all the land to the north to be a single island, rather than three. Nonetheless, this was a first step in the process of sorting out the complex islands directly east of New Guinea.

Literary Pacific Landscapes

On Dampier's third voyage, internal squabblings among the crew and concern about the seaworthiness of the vessel led the quarter master, Alexander Selkirk, being left behind on Juan Fernandez (Fig. 105). Four and a half years later, at the end of January 1709, Dampier again reached Juan Fernandez, where Selkirk had managed to eke out an existence as the island's sole human inhabitant.

Selkirk's saga of isolation became known through the publication of Rogers' account of the voyage, from which the story was extracted and popularized in a couple of separate accounts, and finally gained immortality in the form of Daniel Defoe's 1719 fictionalized *Robinson Crusoe,* which included a fanciful map of the island. In an unusual instance of geographic nomenclature following fiction, *Robinson Crusoe* today denotes the main island of Juan Fernandez. The island lying 160 kilometers to the west is now named for the real-life Crusoe, *Alejandro Selkirk.*

Seven years after the publication of *Robinson Crusoe,* the Pacific was again the canvas of a novelist's pen. In 1726, an Irish clergyman named Jonathan Swift published a story of four voyages by one Lemuel Gulliver to "remote nations" during the period 1699 to 1715—*Gulliver's Travels.* On the first voyage, shipwreck puts Gulliver ashore in Lilliput (Fig. 106) in the southwestern Pacific. Swift maps Lilliput to the north and west of Tasmania, yet with no trace of Australia in sight. But the absence of Australia is understandable, since Tasmania is placed on the same meridian as the Sunda Strait—a literary license of about 45° longitude.

On the second voyage, blown off course east of Japan, he finds himself on Brobdingnag, a land jutting into the Pacific and connected to the Northwest Coast of America by a narrow neck (Fig. 107). Here Swift includes mapmakers in his satire, using a then-common argument for the existence of Terra Australis, spherical balance, to "prove' a great *northern* landmass: "From whence I cannot but conclude, that our Geographers of Europe are in a great Error, by supposing nothing but Sea between Japan and California: For it was ever my Opinion, that there must be a Balance of Earth to counterpoise the great Continent of Tartary; and therefore they ought to correct their Maps and Charts, by joining this vast Tract of Land to the Northwest Parts of America; wherein I shall be ready to lend them my assistance."

RUSSIE
BLANCHE
OU MOSCOVIE
TARTARIE
ORIENTALE
EMPIRE DE LA CHINE
ASIE
OCEAN
INDIEN
ORIENTAL
NOUVELLE
HOLLANDE
Ooster Variatie
Wester Verandering
Ooster Variation
DE L'ORIENT JUSQUES A L'OCCIDENT
van Oosten tot het Westen

The third voyage brings him to the seas east of Japan, where he encounters Laputa, an island that hovers above the ground and moves about by magnetism. Below it, on the surface of the earth, is an island called Balnibarbi. From there he goes to Glubbdubdrib, realm of a sorcerer, and Lugnagg, thence to Japan (Fig. 108).

A mutiny by his crew puts Gulliver ashore on Houyhnhnms Land on his fourth and final voyage (Fig. 109). The island lies south of Australia, which Swift's map identifies with the discoveries of Pieter Nuyts in 1627 *(Nuyts Land*) and those named for the vessel *Leeuwin* in 1622 *(Lewins Land*).

Further Searches for Terra Australis

The Pacific land reported by Edward Davis, Dampier's buccaneer friend, proved to be as elusive as the fanciful islands conjured by Jonathan Swift. Davis appears to have been a capable and relatively benevolent pirate, but was illiterate and his influence principally second-hand—thus the importance of Dampier's 1697 narrative recording that in 1687 Davis had discovered what might be the coast of the long-sought southern continent. Sailing in the *Batchelors Delight* out of the Galapagos, "standing thence South ward for

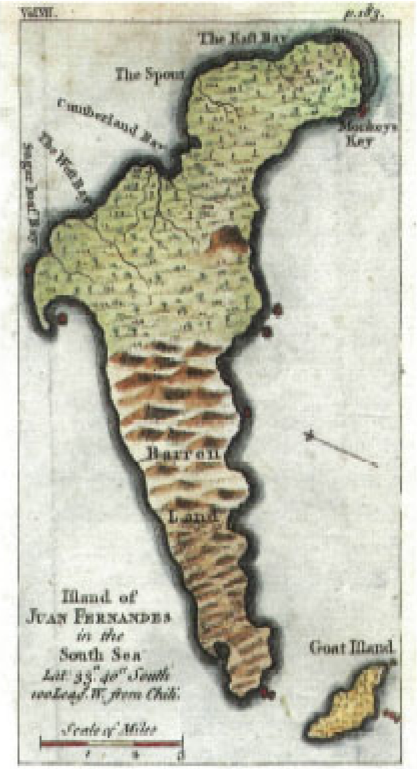
Wind, to bring him about *Tierra del Fuego,* the Lat. of 27 South, about 500 leagues from *Copayapo,* on the Coast of *Chili,* he saw a small sandy Island just by him; and that they saw to the Westward of it a long tract of pretty high Land, tending away to the North West out of sight. This might probably be the Coast of *Terra Australis Incognita!"*

Dampier's influence was quick, Davis's coast being found on some French maps within the year. J. B. Nolin's depiction from about 1740 (Fig. 68) is typical: a scant northeast coast of an indeterminate landmass, accompanied by "land discovered by the English captain David," as the French often called him (Johann Reinhold, in his translation of Bougainville's account, complained that the French were cavalier about such things). One of the islands discovered in the search for Davis Land was Easter Island; Buache (back endpaper), who already knew of the discovery, places the two in close proximity. Davis's sighting could, in fact, have been Easter Island, its longitude poorly estimated.

The European Discovery of Easter Island and Samoa

The eighteenth-century renaissance in the mapping of Oceania began with Jacob Roggeveen. Following a successful career with the Dutch East India Company, Roggeveen turned his energy to pursue a dream he inherited from his father: a voyage westward across the ocean in search of the elusive austral continent, which had now taken on a new dimension with the reports of Davis Land.

The VOC granted Roggeveen a fleet of three vessels for the endeavor, sailing from Texel in August 1721 and entering the Pacific through the Le Maire Strait. After sailing to higher than 60° S and failing to find Terra Australis, he headed to Juan Fernandez, and then hunted for Davis's sighting. Although it was not to be found, by continuing generally west he discovered a heretofore unknown island which indeed lay at 27° S, the same latitude which Dampier's 1697 book had assigned Davis Land. In recognition of the holiday on which it was discovered, they named it Easter Island.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p.183.
The East Bay
The Spout
Cumberland Bay
The West Bay
Sugar loaf Bay
Monkeys Key
Barren
Land
Goat Island
Island of
Juan Fernandes
in the
South Sea
Lat. 33° 40' South
100 Leag. W. from Chili.
Scale of Miles

Fig. 105. Juan Fernandez, from Tobias Smollett, *A compendium of authentic and entertaining voyages,* 1756. Smollett, a novelist and historian, drew from the maps of Thomas Jeffries. The Juan Fernandez islands were encountered when Spanish pilots sailing between Peru and Chile veered away from the coast to catch advantageous currents and winds. Their recorded discovery occurred late in 1574, when Fernandez gave the names San Felix and San Ambor to two of its isles. They first appear on printed maps on Ortelius's 1587 map of America (Fig. 57), the name *Ambor* corrupted to *Nabor,* and the discovery date misstated as 1572.

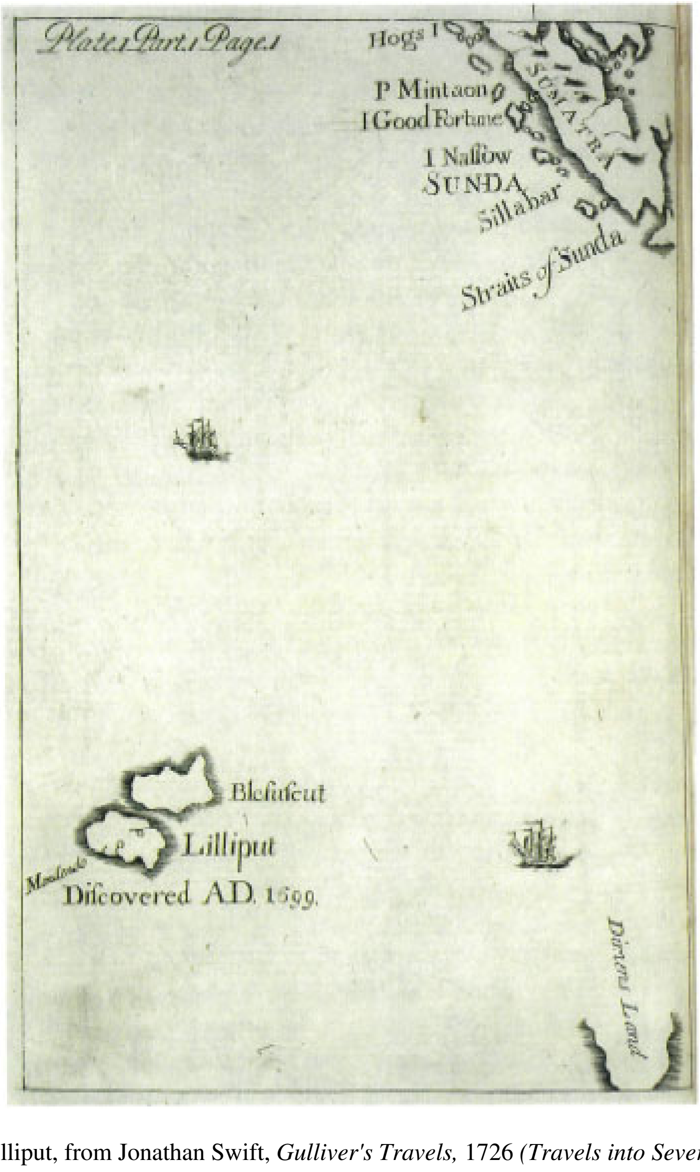


Plate 1 Part 1 Page 1
Hogs I
P Mintaon
I Good Fortune
I Naſſow
SUNDA
Sillabar
SUMATRA
Straits of Sunda
Blefuſcu
Lilliput
Diſcovered A.D. 1699
Dimens Land

Fig. 106. Lilliput, from Jonathan Swift, *Gulliver's Travels,* 1726 *(Travels into Several Remote Nations of the World, 1735).* [**Antipodean Books, Maps & Prints**]

Roggeveen next reached several islands, some uninhabited, some with hostile people; they were at the northern Tuamotus. Their vessel, the *African Gallery,* was wrecked on rocks off one of the Tuamotus, which island consequently inherited the name Disastrous *(Schadelijk*) Island (Takapoto?). These islands were "adorned with a delightful verdure and covered with trees, amongst which were plenty of coconut."

Scurvy now began to afflict the crew with such severity that when an island "of good height and beautiful" was sighted, musket fire was used to assure patience from the Tuamotans to allow some of the Dutch to swim ashore and gather supplies. The next day, "not only to gather beneficial herbs, but also to endeavor to make some beneficial discovery," they returned in greater numbers and had a civil, but tense, meeting with the king. The islanders apparently tried to trick them into a valley where they could be stoned from above. Despite the bloody incident, the life-saving sacks of vegetables Roggeveen acquired led them to name the island "Refreshment" *(Verwikking*). Placed at 16° S latitude, it was probably the atoll of Makatea, in the Tuamotus.

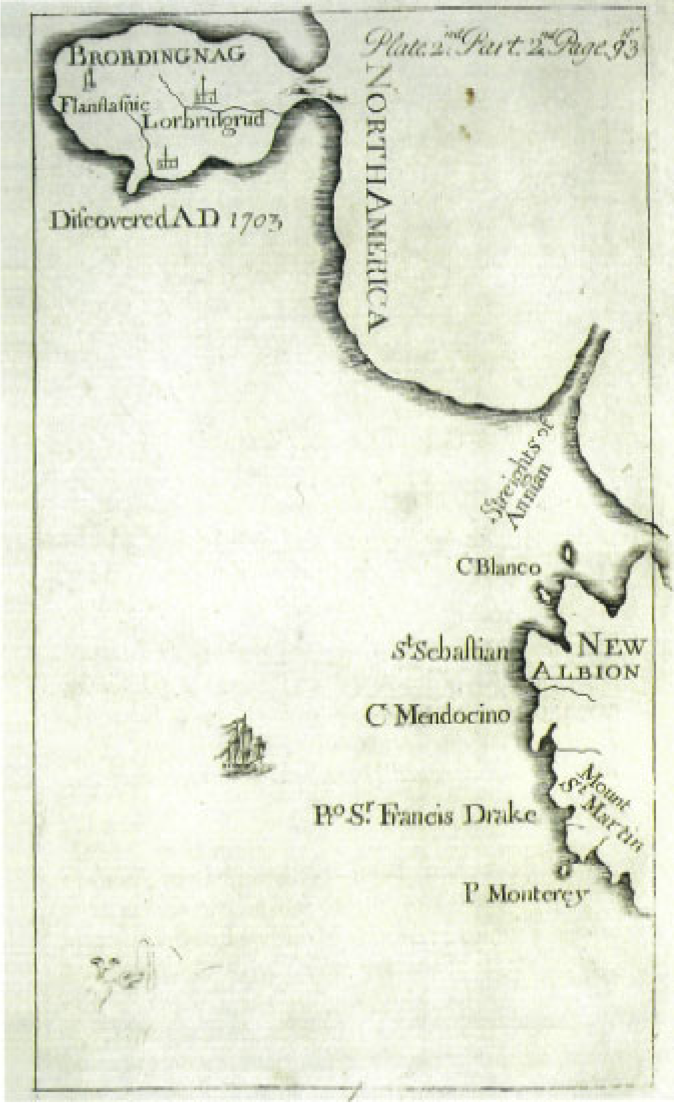


Plate 2nd Part 2nd Page 93
BROBDINGNAG
Flanflaſnic
Lorbrulgrud
Diſcovered A.D 1703
NORTH AMERICA
Streights of Annian
C Blanco
St Sebaſtian
NEW ALBION
C Mendocino
Mount St Martin
Po St Francis Drake
P Monterey

Fig. 107. The mythical land of Brobdingnag is a mainland peninsula above the island of California. Swift, 1726 (1735). [Antipodean Books, Maps & Prints]

These were worthwhile discoveries, but not the object for which the expedition had been funded. Yet although its true goal, the southern continent, had not been achieved, many of the crew were dangerously ill, so the decision was made to abort the mission and veer N W in order to return home via known routes through the East Indies. That decision to "end" the exploration brought them to major discoveries. The first discovery, however, was not recognized as such and so added nothing to maps. Two islands were sighted, one "very high, perhaps 8 leagues in circuit," while the other appeared much lower and was "of a reddish land, without trees, extending, according to our conjectures, to 11° S latitude." They were probably passing Bora Bora and Maupiti, anticipating the formal European discovery of the Society Islands by more than four decades; but Roggeveen wrongly deduced that these islands were the Cocos and *Veriaders* islands of Le Maire.

After swells diverted their vessels to the north, they set their sails for the west and then "discovered several islands all at once." The islands "appeared of a very agreeable prospect, and, in fact, on approaching them, we found they were furnished with fine fruit trees, with all sorts of herbs, legumens, and plants." Several thousand men and women swarmed the shore, all of them "white, and not different in this respect from us Europeans, except that some amongst them have their skins burnt by the heat of the sun." They had become the European discoverers of Samoa. Roggeveen found these people to be "gay in their conversation, gentle and humane towards one another, without the least appearance of savagery." From the waist down the people were covered with "fringes, and with a kind of stuff of silk, curiously woven" (tapa), and "around their neck they wore strings of all kinds of odoriferous flowers." Samoa was "the most civilized and honest nation we saw in the islands of the South Sea."

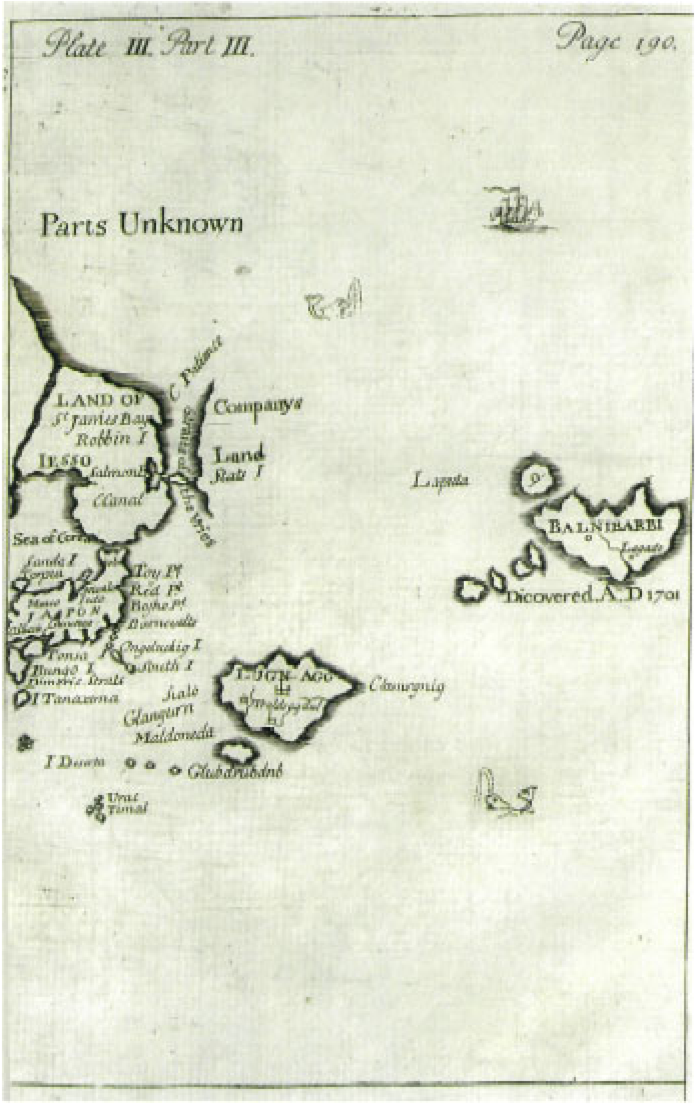


Plate III. Part III.
Page 190.
Parts Unknown
LAND OF
S^t James Bay
Robbin I
IESSO
Salmon
Canal
C Patience
Company's
Land
Stats I
Sea of Corea
Tory P^t
Red P^t
Bosho P^t
Barneveldt
JAPON
Tonsa
Bungo I
I Tanaxima
Smith I
Jsalo
Glanguen
Maldonada
I Dawn
Glubdubdrib
Clumegnig
Laputa
BALNIBARBI
Lagado
Dicovered A.D 1701

Fig. 108. Japan, Hokkaido (Iesso), Company's Land, and mythical Lugnagg, Laputa, and Balnibarbi. Swift, 1726 (1735). [Antipodean Books, Maps & Prints]

The name of Bauman, captain of the vessel *Tienhoven,* was bestowed upon the easternmost Samoan group, the Manua islands, and the vessel's name was given to Tutuila, the main island of what is now American Samoa. Roggeveen had difficulty fixing Tutuilas latitude "because the shadow of the horizon of the graduated arc fell on the land, by which it was prevented from being brought into a precise agreement and conformity with the horizon of the sky. "The result of their attempts was 13°44' S, about a half degree too far north. Longitude was judged to be 200'° 55' E (using the convention of Tenerife in the Canary Islands as prime), which was about five degrees too far west.

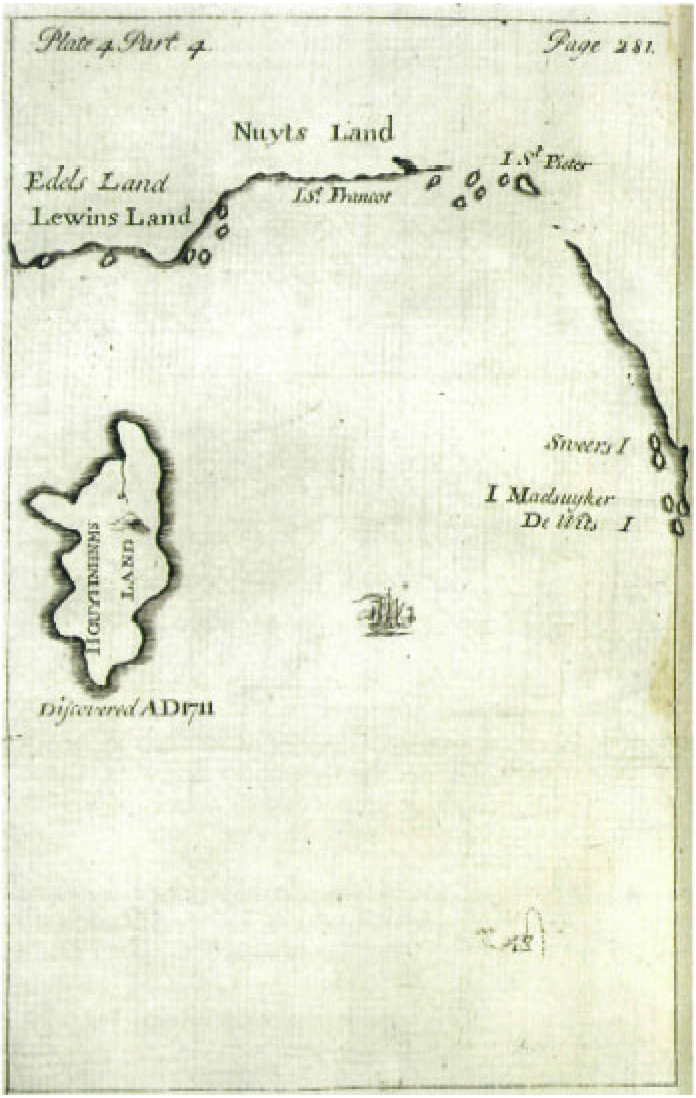


Plate 4 Part 4
Page 281.
Nuyts Land
I. St Pieter
Edels Land
Lewins Land
I. St Francis
Sweers I
I Maatsuyker
De Witts I
HOUYHNHNMS LAND
Discovered AD1711

Fig. 109. Houyhnhnms Land, inhabited by wild humans (yahoos) and civilized horses (Houyhnhnms). Swift, 1726 (1735). [Antipodean Books, Maps & Prints]

Roggeveen found the islanders eager for iron, which he thought they used to make their canoes. A king in the eastern Samoas, in contrast, was principally interested in obtaining beads. That king, "sitting in a canoe, and having by him a young woman of 18 or 19 years, whose neck was encircled by a string of oblong blue beads, asked the Mate by signs if he had any such, pointing to the said string." The Samoans may have acquired such Europeans beads through trade with Tonga.

The search for the austral continent, this time in the guise of Davis Land, had like many before him taken Roggeveen on a wild chase through the southern Pacific. The folly, however, had added Easter Island and Samoa to the map, and helped initiate the great period of Pacific exploration that blossomed a few decades later. Roggeveen's cartographic influence can be seen on some general maps by the mid-eighteenth century, such as that of Buache (back endpaper), although it was quickly overshadowed by that of the more glamorous voyages that followed.

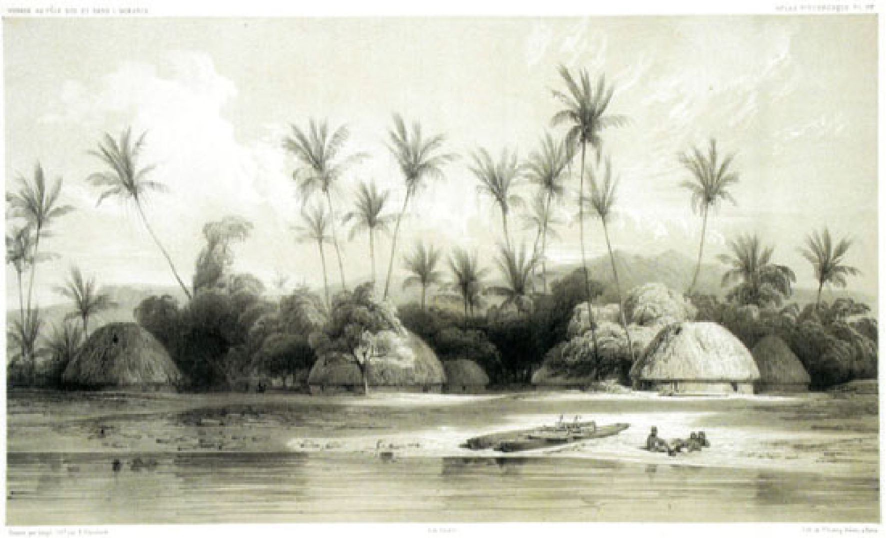


Fig. 110. *Cases de Naturels a Apia,* d'Urville, 1842. Houses along the shore in Apia, on the Samoan island of Upolu, as seen by d'Urville when he visited and mapped the islands in 1828 on his second Pacific command. Samoan houses were relatively uniform in design, and raised above the ground by posts. The roof thatching was supported by rafters made from several pieces lashed together to achieve the necessary curve, then intersected with ribs and secured to the posts. [Kauai Fine Arts].

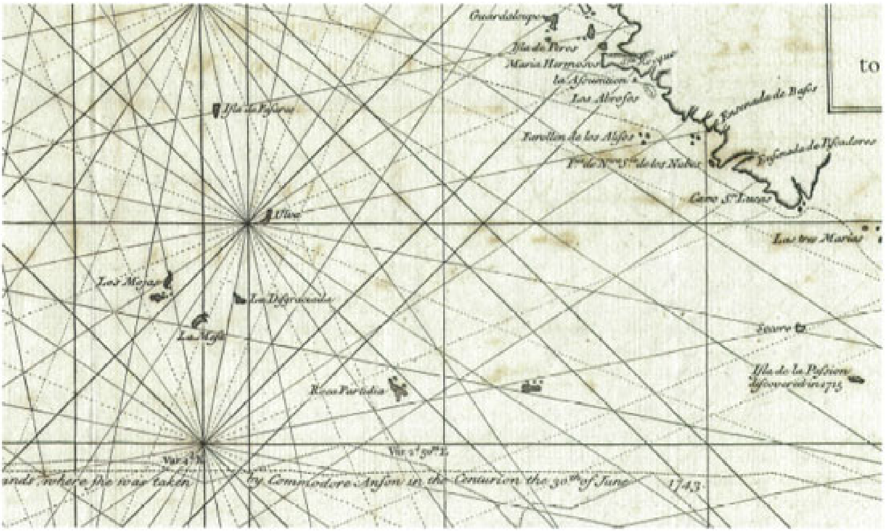

Guadalupe
Ysla de Pinos
Maria Hermosa
la Assumption
Los Abrojos
Ysla de Pajaros
Farellon de los Alijos
Ensenada de Bajia
Ensenada de Pescadores
Cabo S. Lucas
Las tres Marias
La Mesa
Los Majos
La Desgraciada
Socorro
Ysla de la Pasion descovierta in 1715
Roca Partida
Var. 2° 50′ E.
by Commodore Anson in the Centurion the 30th of June 1743

Fig. 111. A section of a map published with the account of Anson's voyage (1748), based on a Spanish chart he acquired during the circumnavigation. *La Mesa, LosMajos,* and *La Disgraciada* are among islands some believed represent early Spanish discovery of Hawaii (see page 154).

A Renaissance of English Voyages

In contrast to Roggeveen, George Anson's circumnavigation of the world in 1740-4 did little to enrich knowledge of the Pacific, retracing as it did Spanish routes across the ocean and making no discoveries. The printed account of his voyage was influential by virtue of its popularity Its map of the Philippines, showing the route of the Spanish galleons, was widely copied, and its charts of the northern Pacific (Fig. 111) unduly influenced pilots, largely by virtue of their Spanish origins. Anson's observations were sometimes worthwhile, for example, that compass variation agreed closely with that predicted by Halley forty years earlier.

Perhaps most interesting to its contemporary audience, it reproduced two of the charts Anson pilfered from the Manila Galleon and thus helped disseminate Spanish geographic knowledge about the north Pacific. As the account explains, in addition to its substantial booty of riches "there were taken on board the galeon several draughts and journals [and] a chart of all the Ocean, between the Philippines and the coast of Mexico, which was what was made use of by the galeon in her own navigation. A copy of the draught, corrected in some places by our own observation, is here annexed, together with the route of the galeon traced thereon from her own journals."

These Spanish charts caused more confusion than they remedied, however, and even a century later pilots were still laboring over the errors Anson had introduced with them. Captain Henry Martin of the British ship *Grampus,* en route from Hawaii to Tahiti in early September 1846, complained that his ship should have been actually on "Manuel Rodriguez shoal, as laid down in the chart…. This danger has been copied into all modern charts from that taken by Ld Anson on board the galleon 'Nuestra Sinora de Capadonga." Captain Martin theorized that a dead whale or shipwreck had been mistaken for a rock.

Spain continued to be influential in the mapping of Micronesia and the Philippines. The 1727 map by Francisco Diaz Romero and Antonio de Chandia (Fig. 112) included political and navigational information, and the galleon route between Manila and Acapulco. While showing a gradual maturing of the mapping of the central and northern Philippine islands, its flawed depiction of Mindanao reveals how poorly the south was known to the Spanish, even at this relatively late date. Seven years later, the more famous and influential map of Pedro Murillo Velarde was published, eclipsing the impact of those that came before it.

The four-year period 1765-9 witnessed a remarkable flourishing of activity by English vessels in Polynesia: those of Byron, Wallis, Carteret, and Cook. In contrast to Anson's voyage of a quarter century earlier, these were true exploratory expeditions. Mapmakers now had an unprecedented bounty of new shores to place in Oceania, many charted in sufficient detail to allow a separate map for each. The richest published source of new maps was Hawkesworth's 1773 *An Account of the Voyages undertaken by the Order of His present Majesty,* an inept record of the voyages of Byron, Wallis, Carteret, and the first voyage of Cook. Illustrated here are two contrasting examples, one from Hawkesworth's *Voyages* (Fig. 113) which focuses closely on, as its title states, the "Islands discover'd in the Neighbourhood of Otaheite," and a general map published by Antonio Zatta in Venice (Fig. 115).

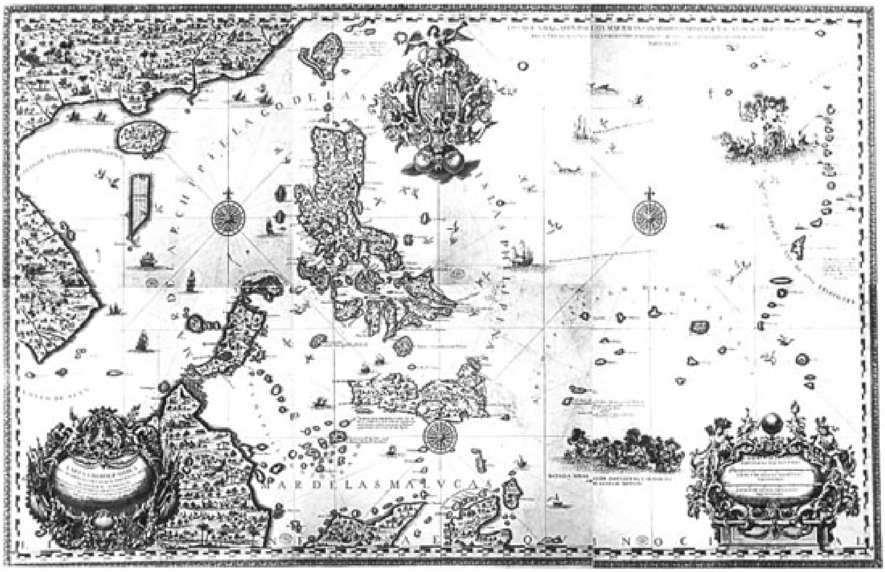
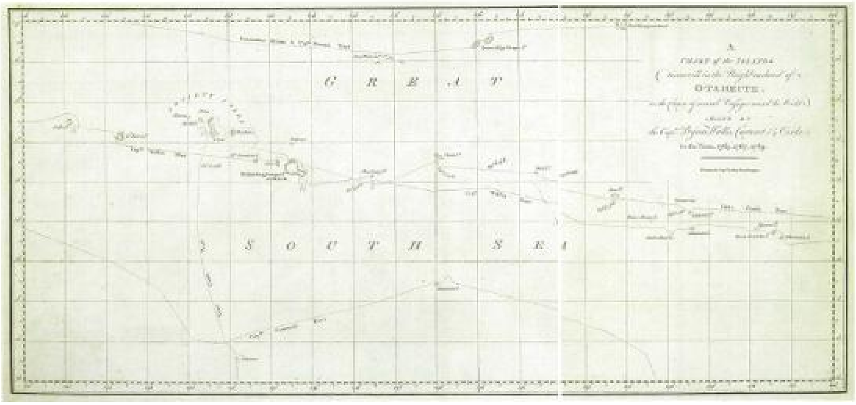


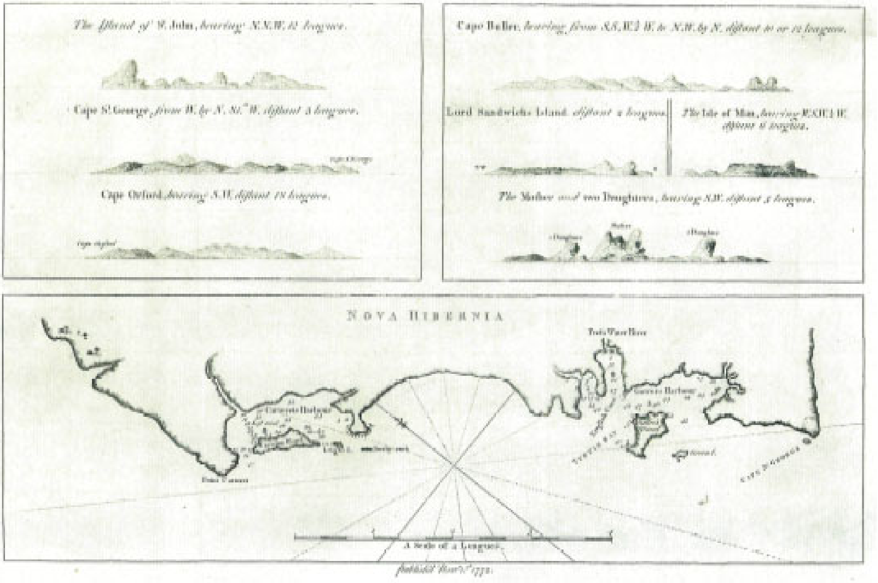
Fig. 112. The Philippines and western Micronesia, Francisco Diaz Romero, 1727. [Rodrigue Lévesque]

First—but least influential—was the voyage commanded by John Byron, an alumnus of Anson's circumnavigation. Sent to search for a northwest passage in the American Northwest, after leaving the Strait of Magellan he judged his vessel to be in too poor condition to withstand the assigned voyage, so he changed his sites to the south Pacific. After refreshing at Masafuero (the westmost of the Juan Fernandez islands), Byron (yellow tracks on the Zatta map) sailed northwest to catch the trade winds. On June 7, 1765 he sighted two islands, Napuka and Tepoto of the northern Tuamotus. Being deterred from landing by forbidding islanders, he dubbed the pair "Islands of Disappointment" (straddling the top right on the Hawkesworth map; on the Zatta, they are the islands of Contratempo). Two more islands were found to the west; a beach was secured after killing a few of the islanders, allowing the crew to resupply. These he named King George Islands, which were Takaroa and Takapoto (not to be confused with Tahiti, later named for the same sovereign by Wallis). Byron's tracks as recorded on the Hawkesworth map end at his discovery of Rangiroa, his "Prince of Wales Island," where he did not try to land. One of the Kiribati Islands was discovered and named for himself—perhaps Nukunau.

Next, the two green tracks on the Zatta map was a fleet of two ships commanded by Samuel Wallis in the *Dolphin,* the same vessel in which Byron had just returned, and Philip Carteret in the *Swallow,* an inferior and ill-equipped sloop. After they passed through the Magellan Strait in April 1767, a storm engulfed Carteret's vessel, and was presumed by Wallis to be lost. Wallis's first encounter in the Tuamotus, was the island of Pinaki, which he named Whitsun, it being the eve of that holiday.

Fig. 113. A *Chart of the Islands discover'd in the Neighbourhood of Otaheite,* Hawkesworth, 1773. When Cook set out from Plymouth on his first circumnavigation in August 1768, no effort had been spared in preparing the *Endeavour for* the voyage—except, in hindsight, for the chronometer, newly invented by the eccentric genius John Harrison. But the chronometer, which would have facilitated Cook far more accurate mapping of his Pacific landfalls, had not yet been approved by the Admiralty. Cook entered the area of the Tuamotus and Society islands at a latitude between those followed by Byron and Wallis. The first few of the Tuamotus he reached, Vahitahi, Akiaki, and Hao, had, unknown to Cook, already been found a year earlier by Bougainville. Cook named these three Lagoon, Thrumb-Cap, and Bow, all marked on the chart. Cook kept his course, and named the next islands "The Groups" (Marokau and Ravahere), Bird Island (Reitoru), and Chain Island (Anaa), all marked as such on the chart. After passing by Osnaburgh, Cook reached Tahiti.


GREAT
SOUTH SEA
OTAHEITE


The Island of St. John, bearing N.N.W. 12 leagues.
Cape St. George
Cape Orford, bearing S.W. distant 18 leagues.
Cape Buller, bearing from S.S.W. to N.W. by N. distant 10 or 12 leagues.
Lord Sandwich's Island distant 2 leagues.
The Isle of Man, bearing W.S.W. distant 8 leagues.
The Mother and two Daughters, bearing S.W. distant 5 leagues.
Mother
Daughter
Daughter
NOVA HIBERNIA
Carterets Harbour
Gowers Harbour
Cape St. George
A Scale of 4 Leagues.
Published 1772.

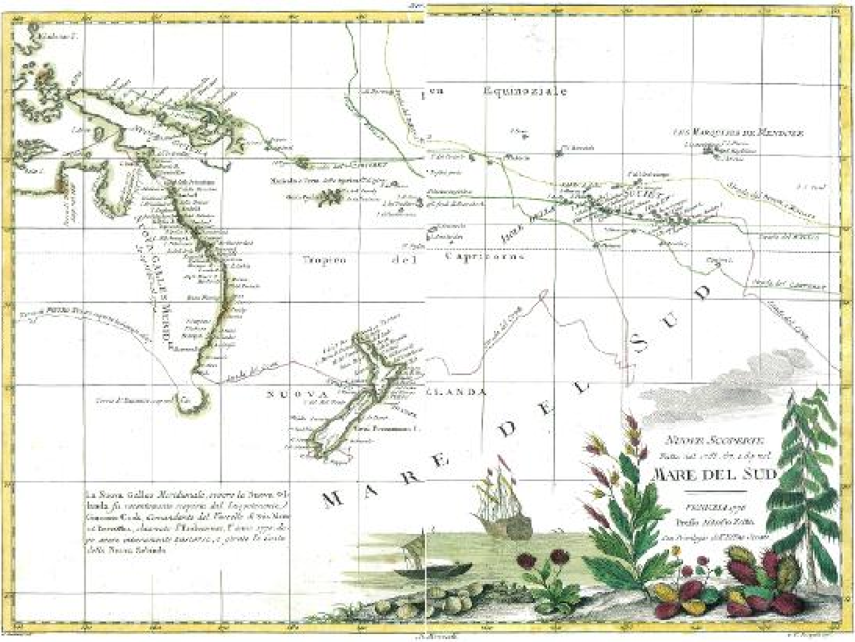
Left Fig. 114. In 1767, Carteret pierced through what had been supposed to be a bay on New Britain's eastern coast. The "bay" that had earlier been named St. George now became St. George's Channel, and the land to the north was dubbed New Ireland. Carteret then discovered another strait at the northwest end of the thin, diagonal island, naming the island beyond it New Hanover. On this map of the southwestern tip of New Ireland from the account of Carteret's voyage in Hawkesworth (1773), north runs diagonally to the upper left, so that Cape St. George on the far right is the southern tip of the island, and the northeast coast of New Britain would be below the map. The profiles on the upper section are of neighboring coasts; Isle of Man, for example, is Watom Island. *Overleaf.* Fig. 115. The south Pacific, Antonio Zatta, 1776, recording the voyages of Byron, Wallis, Carteret, and Cook. [Lahaina Printsellers, Ltd]

Continuing west, he found Nukutavake *(Queen Charlotte),* Vairaatea *(Egmont),* Paraoa *(Gloucester),* Manuhangi *(Cumberland),* and Nengonengo *(Prince William Henry),* marked on both charts. Sailing four days from

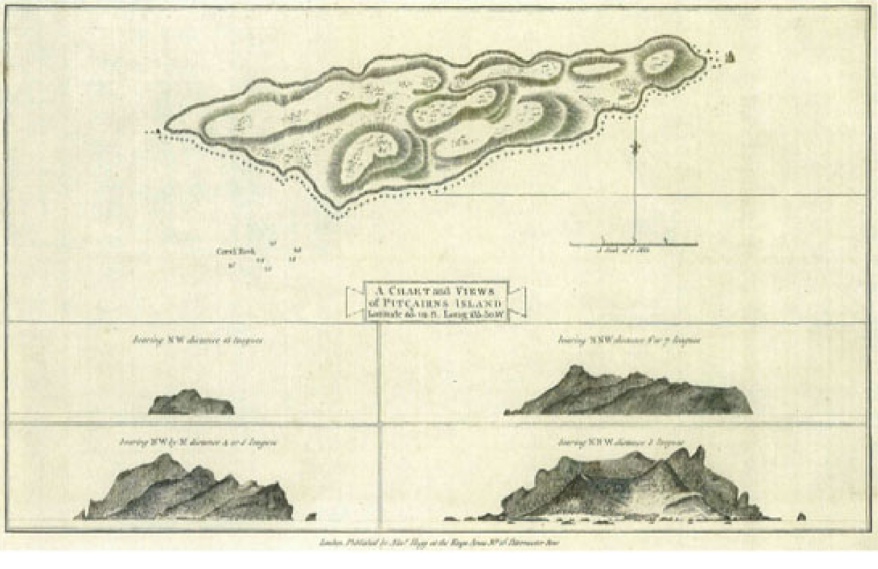
Nengonengo, on June 17 he found Mehetia, the most easterly of the Society Islands, which he named Osnaburgh. Wallis's greatest discovery came the following day, June 18, 1767—Tahiti, which he named King George III Island. The chart from Hawkesworth designates the island as "Wallis's King George" to differentiate it from Byron's island in the Tuamotus, while Zatta denotes it *Taiti,* probably following Bougainville.

From Tahiti, Wallis continued westward past Moorea, then on to Tapuaemanu *(Sir Charles Saunders Island),* Mopiha *(Lord Howes Island),* and Fenua *(Scilly Islands).* By mid-August, concerned about his leaking ship, and judging that further reprovisioning would be difficult, he sailed north for the Marianas. Two days later, an unknown island was encountered which the officers named after their commander, and is now known both by the name Wallis and Uvea.

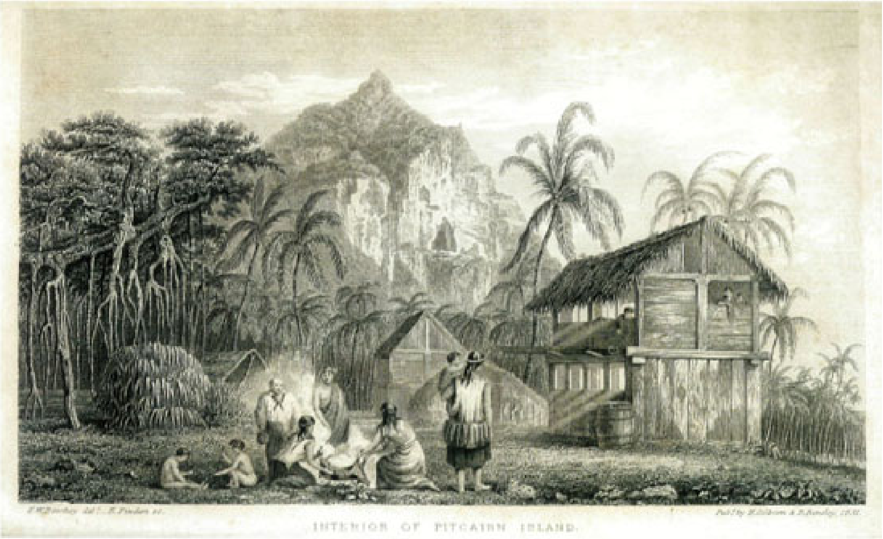
Philip Carteret and the *Swallow,* meanwhile, had not perished as Wallis feared. Carteret had managed to hold onto the vessel through the storm, and boldly set out across the ocean despite the ailing ship, the lack of forge and iron, and no articles of trade. Juan Fernandez had been fortified by the Spanish, so Carteret instead refreshed, despite rough seas, at Masafuero. Sailing west in search of Davis Land and a southern continent in June, the middle of winter, the lack of food forced Carteret to keep his sails dangerously full. Yet, when a midshipman named Pitcairn sighted an unknown island, the seas prevented them from landing (Fig. 116). Ironically, while Carteret and crew were at their discovery of Pitcairn, Wallis was at his great discovery of Tahiti—a fateful juxtaposition given what would come to pass a couple of decades later when William Bligh sailed to the island on the *Bounty.*



Linea Equinoziale
Les Marquises de Mendoce
Tropico del Capricorno
Nuova Galles Meridionale
Nuova Zelanda
Mare del Sud
Nuove Scoperte
Mare del Sud
Firenze 1776
Presso Antonio Zatta



A Chart and Views
of Pitcairns Island
Latitude 25. 2 S. Long. 133. 21 W
Bearing N.W. distance 16 leagues
Bearing N.N.W. distance 8 or 9 leagues
Bearing W.W. by N. distance 4 or 5 leagues
Bearing N.b.W. distance 2 leagues
London. Published by Alex.r Hogg at the Kings Arms No. 16 Paternoster Row


INTERIOR OF PITCAIRN ISLAND.

Above. Fig. 116. Pitcairn by Carteret, from Hawkesworth (1773). When Fletcher Christian led a mutiny against William Bligh, this map was among the *Bounty's* onboard references and inspired the mutineers' destiny. Not only was Pitcairn ideal for the purpose—temperate and inhabitable on the one hand, yet remote and difficult to approach on the other—but once they found it and realized that Carteret's map placed the island more than 3° too far west, the imperfectness of the map in itself was an attraction, since the error promised to delay its being visited by others. *Belour.* Fig. 117. View in Pitcairn, Frederick Beechey, 1831. [Lahaina Printsellers, Ltd]

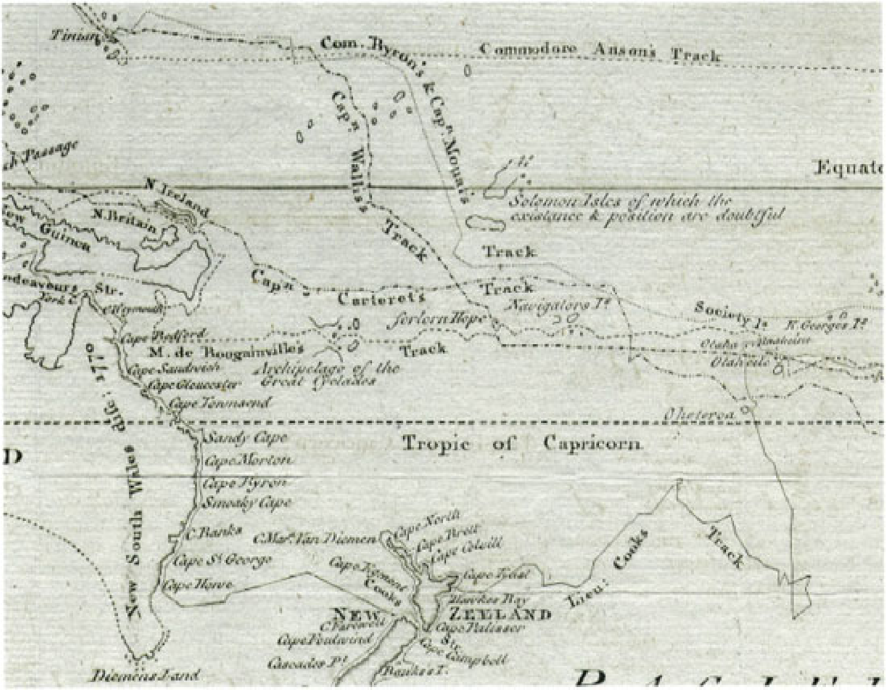
The onset of scurvy and exhaustion forced Carteret to climb to lower latitudes to catch the trade winds. In doing so, small islands in the southern Tuamotus were discovered and named for various English noblemen, usually condensed to Duke of Gloucester; these, the only point on Carteret's itinerary marked on the chart in Fig. 113, include Mururoa Atoll, site of the French government's above- and below-ground nuclear tests two centuries later.

Continuing far west, Carteret came across a cluster of islands he named Queen Charlotte's, not knowing that it was the Santa Cruz group of Quiros, and reached Vanikoro. Their situation was too desperate for Carteret to search any further for a southern continent, so he continued instead to the west, coasting Ndeni (Nendo), which he dubbed Egmont. The crew's weakened state made it impossible to obtain any of the provisions seen in plenty on the coast. Passing Tinakula volcano, they next rediscovered the long-sought Solomon Islands; but they did not realize that they had, as the position of the *Swallow was* so far to the west of that normally assigned Mendanas lost world.

Discovering the Kilinailau (Carteret) group and Buka Island along the way, Carteret stopped in New Britain to make ship repairs and take on food and water. Currents then led them to a breakthrough in the mapping of the Pacific: the *Swallow* was coaxed into the "bay" Dampier had named St. George's, and by following the clue, Carteret was finally able to sever into two what had been known as New Britain. The island to the south kept the name, the land to the north was christened New Ireland (Fig. 108), and St. George's Bay become St. George's Channel. This discovery, in turn, brought him to islands he named the Admiralty, which though not new discoveries were poorly known. The complex archipelagos tailing off to the northeast of New Guinea had lost some of their secrets to Carteret.

Rotting and open, the *Swallow* reached the shipyards in Batavia. Fear of the sickness for which this capital of the Dutch Indies was infamous, however, sent Carteret back to sea after she was only partially repaired, despite the season being wrong for sailing. His voyage, slighted by the roar of those that followed, added worthy data to the Pacific map and helped solve the mystery of the Solomons. Vessel and crew would surely have perished under less able hands. "His ship was very small, went very ill, and when we took leave of him, he remained as if it were at anchor," Bougainville, who hailed him en route home, wrote. "How much he must have suffered in so bad a vessel may well be conceived."

Fig. 118 The December 1773 issue of *Gentleman's Magazine* brought its readers this map of the tracks of Wallis, Carteret, Bougainville, and Cook.


Tinian
Com. Byron's & Capt. Mouat's
Commodore Anson's Track
Capt. Wallis's Track
Passage
Equat
N. Ireland
N. Britain
Guinea
Solomon Isles of which the existance & position are doubtful
Track
Endeavours Str.
York C.
Capt. Carteret's Track
Forlorn Hope
Navigators I.s
Society I.s
K. Georges I.s
Otaha
Ulietea
Otaheite
C. Weymouth
Cape Bedford
M. de Bougainville's Track
Archipelago of the Great Cyclades
Cape Sandwich
Cape Gloucester
Cape Townsend
Ohetcroa
Tropic of Capricorn
Sandy Cape
Cape Morton
Cape Byron
Smoaky Cape
C. Banks
C. Mar. Van Diemen
Cape North
Cape Brett
Cape Colvill
Cape St George
Cape Howe
Cape Egmont
Cooks
Cape Turnagain
Hawkes Bay
NEW ZEELAND
Lieu: Cooks Track
C. Farewell
Cape Palisser
Cape Foulwind
St.
Cape Campbell
Cascades P.t
Banks's I.
New South Wales
Diemens Land
D

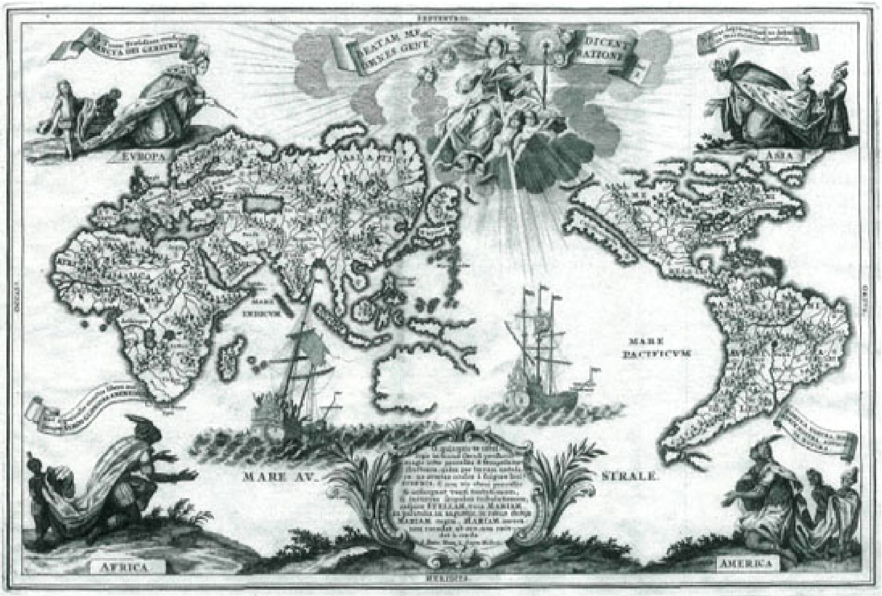


Fig. 119. World map, Heinrich Scherer, 1700. Scherer, a Jesuit, was fond of making thematic maps from otherwise uninspired geography. On this map indicating Jesuit missions around the world, in Oceania there is only a hopeful ship; above it, the powers of heaven offer light to the "heathens" in the four corners of the globe.

Bougainville Follows the English Lead

France also sent a vessel across the southern Pacific at this time, one whose path coincidentally intersected that of the English voyages. A map published in the December 1773 issue of *Gentleman's Magazine* adds Louis Antoine de Bougainville's voyage while dropping the less significant voyage of Byron. Bougainville stumbled across Tahiti after Wallis, only the clear evidence of a recent European visit quelling the inclination to believe he had made a new discovery. In the western Pacific, Bougainville, right after Carteret, found the Solomon Islands, similarly failing to realize that he had done so. And finally, when Bougainville reached New Ireland, he came across a European campsite and found a lead plate with English words recording a recent visit—Carteret's.

Zatta (Fig. 115), though not marking Bougainville's tracks, records his "Gran Cycladi" (Great Cyclades) to the southwest of New Guinea, a name soon changed to New Hebrides by James Cook on his second voyage, and now known as Vanuatu. Zatta also unknowingly mapped one of the lost Solomons by including the island Bougainville dubbed *Choiseul.*

Bougainville's Pacific adventures began after diplomatic duties in the Falkland Islands and a difficult passage through the Magellan Strait. After a futile search for Davis's phantom continent, he made some discoveries in the complex Tuamotus, which he dubbed the "Dangerous Archipelago"—by which name they are still sometimes known. While turning south to avoid their hazards, he speculated as to whether the Tuamotus could be evidence of a southern continent: "It is difficult to conceive such a number of low islands, and almost drowned lands, without supposing a continent near it. But geography is a science of facts; in studying it, authors must by no means give way to any system, formed in their studies, unless they would run the risk of being subject to very great errors, which can be rectified only at the expense of navigators."

In Tahiti, Bougainville added to their crew a Tahitian man named Ahu-Toru. Two days after leaving sight of "Oumaitia" (an island in the vicinity of Tahiti), Ahu-Toru "pointed at the bright star in Orion's shoulder, saying, we should direct our course upon it," and that in two days' time they would reach another island with all the offerings of Tahiti. But although Ahu-Toru was a sensation in France, he was not interesting to geographers as was Tupaia, a Tahitian Cook would later adopt. The English translator of Bougainville's account, indeed, bluntly offers the opinion that Ahu-Toru was rather stupid.

Bougainville is the second European known to have skirted Samoa, an archipelago Ahu-Toru knew nothing of; when the islands were first sighted, the Tahitian first thought they must be Bougainville's home country Islanders came cautiously close in canoes and some trade was carried out, but landing was not possible. "The longitude of these isles," Bougainville wrote, "is nearly the same in which Abel Tasman was, by his reckoning, when he discovered the isles of Amsterdam, Rotterdam, Pylstaart, those of Prince William, and the shoals of Fleemskerk. It is likewise the same which, within a very little, is assigned to the Solomon's isles," this last statement having little meaning given the vast breadth of longitude of the islands. Next came Vanuatu and a brush near the Great Barrier Reef, Bougainville coming closer than his predecessors to a direct encounter with the east coast of Australia. Turning north to retake the known route above New Guinea, he passed unknown coasts which he dubbed Choiseul and Bougainville, among others, not realizing that they were the Solomons.

New Ireland brought them supplies of water and wood, but also an eerie, surreal planet—endless insects, raging storms, and repeated earthquakes. Nonetheless, in Port Praslin on July 13, 1768, a solar eclipse allowed the astronomer Pierre Antoine Veron to fix the bay's longitude.

In late September 1768, after a difficult passage, Bougainville reached Batavia. A map of the coastal neighborhood of this Dutch capital in the East was among those prepared for the published account of the voyage. This chart alone was not included in the final product and survives only in the manuscript version (Fig. 120), recording Pulau Seribu, the "Thousand Islands" (actually about 120) that dot the Java Sea off its coast.

Thomas Forrest in the Western Pacific

While the glamor of pure discovery was deservedly captured by the English and French circumnavigators, the mapping of the western Pacific continued by explorers following the traditional Asian routes. Despite two and half centuries of trade with the Indies, published maps of eastern Indonesian seas were mediocre. Improving the map of the region was part of the goal of Thomas Forrest when he was sent from Balambangan to acquire cinnamon, cloves, nutmeg, pepper, and clove bark in 1774.

Wanting to remain invisible to the Dutch, Forrest left Balambangan in a native vessel, the *Tartar,* which would not attract suspicion and which was small enough to be easily rowed in shallow water. To further ensure his invisibility, he took only two Europeans with him, the rest of his crew being Filipinos, Moluccans, and Lascars (South or Southeast Asian sailors). Forrest sailed for Sulu, brushing byTernate and Tidore, and then Batjan and east to New Guinea. Reaching Geelvink's Bay and Dory Harbor, he found nutmeg trees and determined from the natives that the tree was abundant. But the Dutch did not allow them to trade in it; only the Chinese did so, with permission from the Sultan of Tidore.

In May 1775, Forrest reached Mindanao, where he sought refuge for several months to await the change of monsoon. Here he received news that the English settlement in Balambangan had been sacked by people from Sulu; the island on which he now stood, and Celebes (Sulawesi), were considered alternatives to Balambangan for an East India Company stronghold.

The map of the eastern Indonesian islands accompanying the account of his adventures of 1774-6 (Fig. 121) traces his route and offers more detail than most published maps of the region, but demonstrates how sketchy it remained to European cartographers. Not only are longitudes approximate, but even the relative longitudes of principal islands are in error. The complex shape of Sulawesi eluded geographers, who were all but blind to the stunning, graceful upper arch of Sulawesi Utara, that marked by Forrest as "Under the Dutch." The simple finger-like peninsula of Sulawesi Tengah is reduced to a pointed stub, and the western coast of Halmahera is fully four degrees too far west, thus aligning too far to the west in relation to Mindanao, even though it itself is one and a half degrees too far to the west.

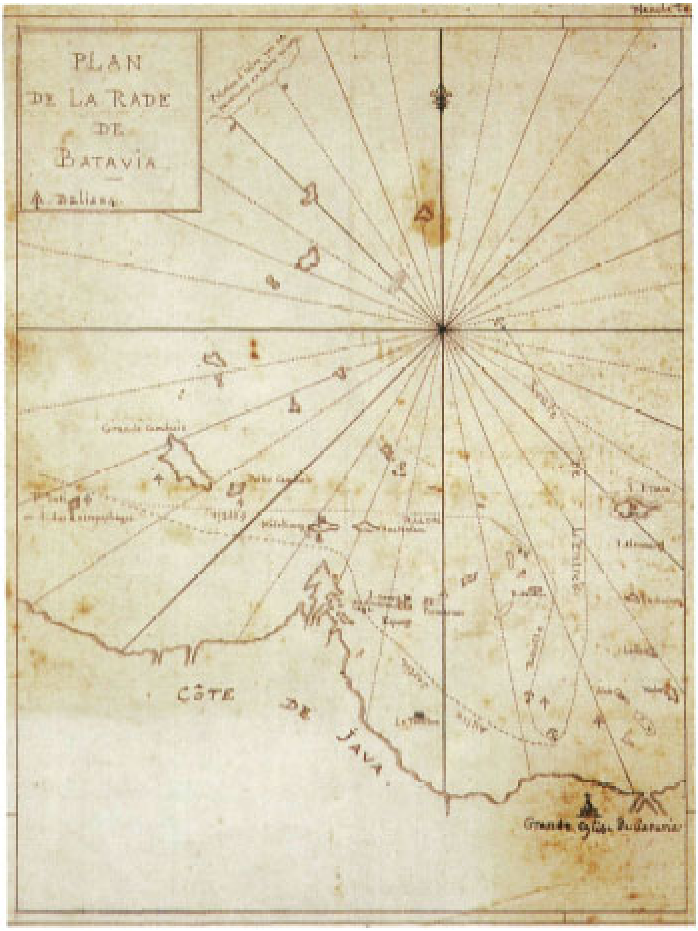
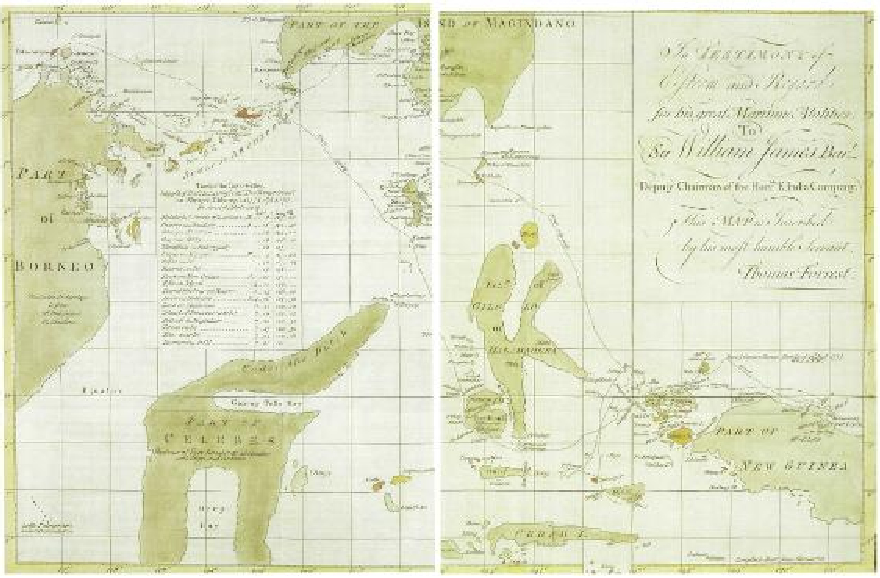
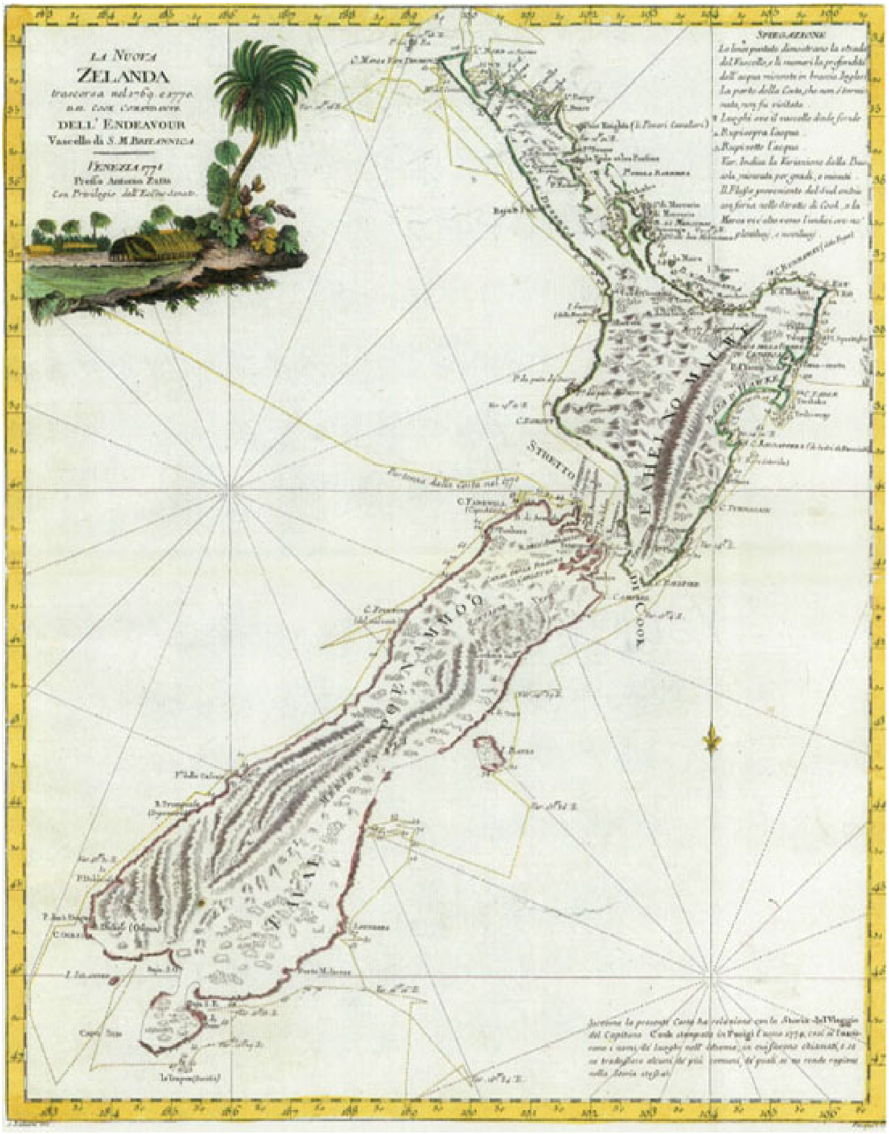


Fig. 120. Bougainville reached Batavia on September 28, 1768, just twelve days alter Carteret left the Dutch Indies capital. [Gowrie Galleries] *Overleaf.*
Fig. 121. Eastern Indonesia, from A Voyage to New Guinea, and the Moluccas, from Balambangan, Thomas Forrest, 1779. In 1774-6, Forrest sailed in a small craft to western New Guinea, hoping to locate sources of spices which were not under the control of the Dutch.

While Europeans were busy collecting data about the Pacific from their own observations and from indigenous sources, their own store of geographic knowledge and cartographic sensibilities was being borrowed by many of the Asian-Pacific peoples with whom they came in contact. Some, for example Bugis mariners of Sulawesi, had practical use for Western maps and methods, using these to complement their own navigating. In other cases, European maps were assimilated but transformed. The Thai map in Fig. 101, part of a religious and cosmographical work made about the same time as Thomas Forrest's map in Fig. 121, is such an incorporation of Western geography, much of it probably gotten a century earlier, adapted to Thai needs.

Orientation and scale became subservient to aesthetics and context. Even when Asian kingdoms adopted Western mapping methods, they usually coexisted with, not supplanted, their own.


PART OF THE
ND OF MAGINDANO
PART OF BORNEO
Equator
PART OF CELEBES
PART OF NEW GUINEA
To
Sir William James Bart.
Deputy Chairman of the Honᵇˡᵉ E India Company
This MAP is Inscribed
by his most humble Servant
Thomas Forrest


La Nuova
Zelanda
trascorsa nel 1769. e 1770.
dal Cook Comandante
dell' Endeavour
Vascello di S. M. Britannica
Venezia 1778
Presso Antonio Zatta
Con Privilegio dell' Eccellmo Senato
Spiegazione
Le linee puntate dimostrano la strada del Vascello, e li numeri la profondità dell' acqua misurata in braccia Inglesi.
La parte della Costa, che non è terminata, non fu visitata.
Luoghi ove il vascello diede fondo
Rupi sopra l'acqua
Rupi sotto l'acqua
Var. Indica la Variazione della Bussola, misurata per gradi, e minuti.
Il Flusso proveniente dal Sud entra con forza nello Stretto di Cook, e la Marea vi s'alza verso l'ondici ore ne' pleniluni, e novilunj.
Eaheinomauwe
Stretto di Cook
Tovypoenammoo
C. Maria Van Diemen
C. Nord
Isola Tolaga
C. Egmont
C. Farewell
C. Turnagain
C. Palliser
C. Campbell
C. Foulwind
I. Banks
Capo Sud
C. Ovest
Punto Molineux
Ritrovata dalla Costa nel 1770
Scorrendo la presente Carta in relazione con la Storia del I Viaggio del Capitano Cook stampata in Parigi l'anno 1774, così si troveranno i nomi de' Luoghi nell' idioma, in cui furono chiamati, e se ne tradussero alcuni dei più comuni, de' quali se ne rende ragione nella Storia stessa.

Chapter 7

The Three Voyages of James Cook

The figure who most revolutionized the mapping of the Pacific was James Cook. Before Cook had ever set out on the voyages for which he is best remembered, he had already established himself as a fine cartographer, particularly in North America in his mapping of the St. Lawrence and of the Carolina coast.

Cook made three Pacific voyages. The primary cartographic contributions of the first were his mappings of New Zealand, eastern Australia, and the Society Islands; of the second, his greatest voyage, definitively settling the question of Terra Australis, adding New Caledonia to the map, and rediscovering the Marquesas. The discovery of Hawaii and the exploration of the Northwest Coast of America were the dominant accomplishments of the final voyage. The first voyage entered the Pacific by South America, the second and third via Africa. The first two were circumnavigations, while the last entered and returned by the African route.

The First Voyage

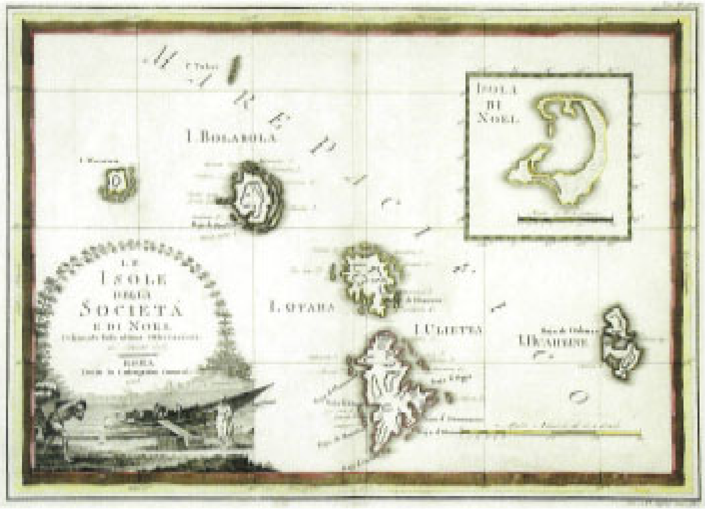
Cook's *Endeavour,* a fine bark specially fortified to inhibit the damage of tropical worms, left Plymouth on August 26, 1768. For his timepiece, Cook still relied on the older pendulum clock technology, as the more accurate, less finicky, and much smaller chronometer had not yet been approved by the Admiralty. Among the scientific members of the crew was the talented young Joseph Banks, a botanist and Fellow of the Royal Society who also contributed to the expedition's financing, and Charles Green, an assistant at the Greenwich Observatory. The expedition's initial, primary mapping goal in the Pacific was not to chart the ocean or its islands, but rather to help scientists map the cosmos. The island of Tahiti was to help measure the distance between the earth and the sun by serving as a Pacific observation point for a transit of Venus (see page 109 above, and Chapter 8).

After sailing through the Le Maire Strait and rounding Cape Horn, Cook fixed their course to the northwest, straight for Tahiti, skimming Vahitahi in the Tuamotus en route. Three months were passed in Tahiti and one month among neighboring islands. In addition to a map of Tahiti itself, a map was made of the rest of the Society group to the northwest: Huahine, Raiatea, Tahaa, Bora Bora, Tupai, and the group of small islets on the west, "Maurua." Longitudes are generally 7-10 kilometers too far west—perfectly respectable, in Cook's circumstances, for the first detailed map of the islands. He refined the coordinates on his subsequent two voyages, resulting in the improved placement of the islands on the Cassini map of 1798 (Fig. 123).

Now accompanied by a Tahitian navigator, Tupaia, they sailed to the south and west in a pattern that allowed them to search both for Terra Australis, if it existed, as well as New Zealand, which had not been visited by Europeans since its discovery by Tasman one and a quarter centuries earlier. The exploration of the two was linked, since it was widely held that New Zealand might be part of the austral continent (Fig. 125). Tupaia added new intrigue to their vigilance of celestial phenomenon: when a comet passed overhead, he "instantly cried out, that as soon as it should be seen by the people of Bolabola [Bora Bora], they would kill the inhabitants of Ulietea [Raiatea], who would with the utmost precipitation fly to the mountains."

The expedition reached 40° 22' south latitude with no sign of a southern continent, but bad weather prevented their sailing far enough to entirely dismiss the hypothetical temperate coastline from charts just yet. Zig-zagging to the west, on October 6 a crew member sighted land: they had reached the eastern shores of the north island of New Zealand. Tupaia was able to communicate with the Maoris, but relations with the islanders were poor. The inlet where they had anchored was dubbed Poverty Bay "because it afforded us no one thing we wanted," an appellation befitting their experience, but not the bay itself. The boy who had first sighted the land, Nicholas Young, received an extra gallon of rum and immortality—the name "Young Nick's Head" still designates the bay's southwestern point.

Opposite: Fig. 122. James Cook's 1769 map of New Zealand was published in Hawkesworth's *Voyages* in 1773, and here re-engraved five years later in Venice by Antonio Zatta. [Lahaina Printsellers, Ltd] *Below.* Fig. 123. The Society Islands to the west of Tahiti, Cassini, 1798, after Cook. [Kauai Fine Arts]

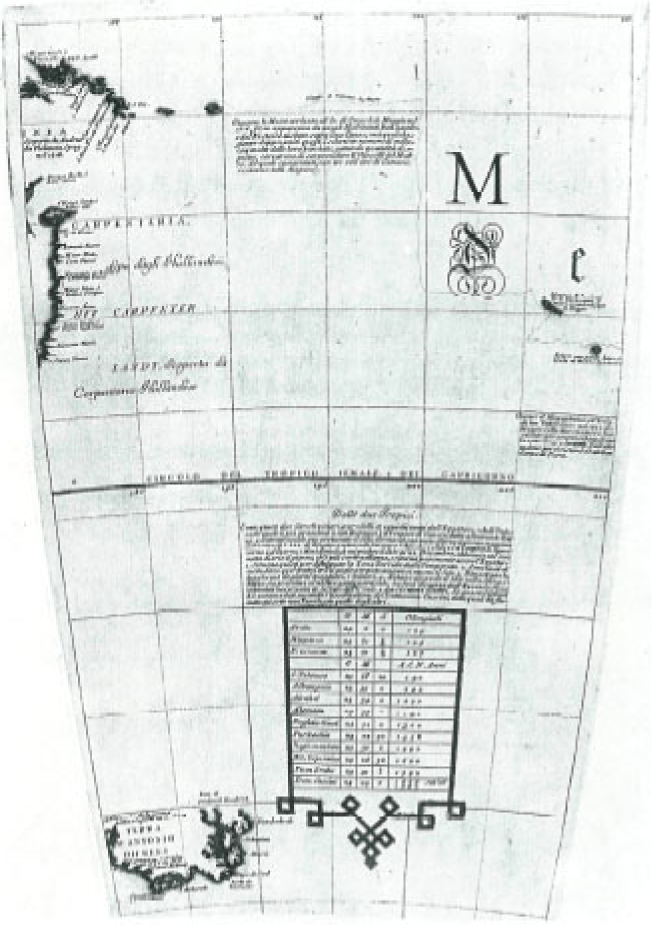


Cook's remarkable surveying of New Zealand began immediately (Fig. 122). Sailing south, a large bay was named Hawkes for the First Lord of the

Admiralty, and its southern point Cape Kidnappers after the Maoris' attempted abduction of aTahitian boy among the crew. A couple of days' sailing further south brought no suitable harbor, so Cook reversed direction. There is no doubt that the prospect that they had finally discovered *Terra Australis* was high in their minds: when master's mate Richard Pickersgill drew some of maps of the new-found coast, he already bestowed them with titles beginning "A Part of the So Continent…."

Throughout the New Zealand reconnaissance, mapping was the overriding priority. In early November, toward the north of the Coromandel Peninsula, a fine little bay was reached from which a transit of Mercury calculated to occur on November 9 could be observed to fix longitude. Here the Maoris were more trustful, giving the English a guided tour of their village and trading, while the strangers set up their astronomical equipment on shore for the observation of the transit. Continuing north along a deep gulf they dubbed "Thames," they reached the spectacular bay they called Bay of Islands. These two areas, Cook reflected at the end of his tour of New Zealand, were the most ideal for an English colony.

Fig. 124. An unmounted globe gore by Coronelli, 1688. Parts of Tasmania, Carpentaria, and New Guinea are shown, but the eastern coasts of Australia remained a mystery. The tracks marked are those of Le Maire, reflecting Schouten's decision to sail north to avoid the risk of getting stranded by west-blowing winds in a New Guinea-Terra Australia gulf. [Martayan Lan, NY]

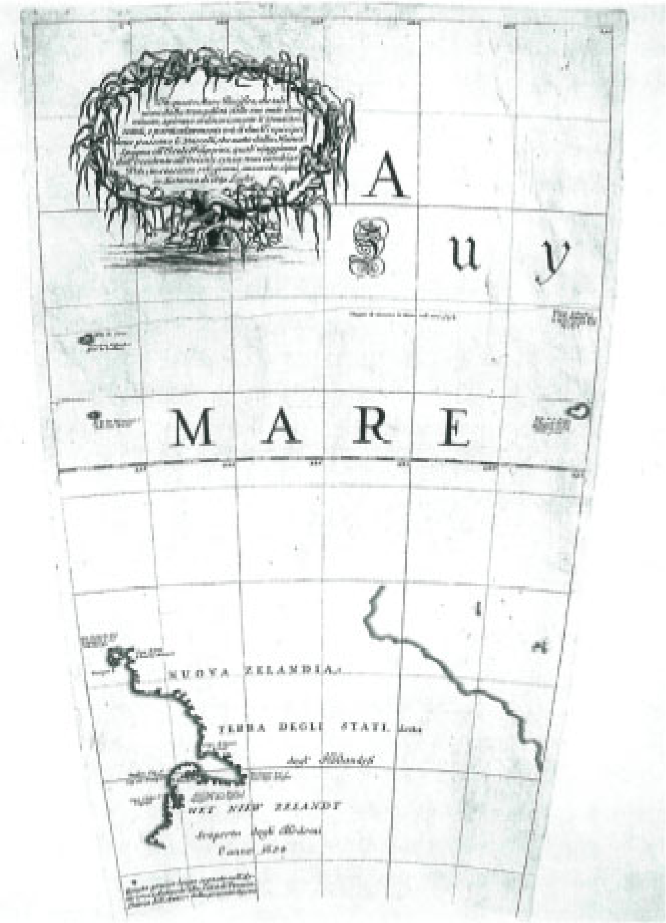


The accuracy of Cook's mapping of New Zealand now began to falter at the hands of the elements. A strong gale shoved the *Endeavour* out of sight of land for the first time in their scouting of the coast. A month of poor weather made sailing nightmarish, and frustrated their surveying of the northernmost part of the island. Cook nonetheless succeeded in ascertaining the coordinates of its northwestern tip (Cape Maria van Diemen, named by Tasman) within a couple of minutes of its true latitude and four minutes of its actual longitude.

Some parts of the northwestern coast had to be left to guesswork before the weather improved, charting continuing as they now made fast progress south. When the coast veered to the west and the snow-capped mountain of Taranaki rose inland, Cook called it Egmont—the name now designating the cape and national park. Leaving Taranaki behind them, they sailed across the mouth of what appeared to be a large bay, for the moment unaware that in its southeastern extreme lay a strait.

Fig. 125. An unmounted globe gore by Coronelli, 1688. Tasman's discoveries in western New

Zealand are recorded by the well-defined coast in the lower left. The tentative eastern coast of New Zealand is not based on any European knowledge of those shores, but rather was a logical adaptation of a Terra Australis coastline into a hypothetical eastern New Zealand coastline. [Martayan Lan, NY]



By this point the *Endeavour was* in need of maintenance. Ideal water in which to service her was had in an inlet they dubbed, accordingly, Ship Cove, in a sound they called Queen Charlotte's. The charting of the various inlets and coasts was continued from boats while work proceeded on the main vessel. The longitude now ascertained by Cook and Green for Queen Charlotte would be challenged by his astronomers three years later, when Cook returned on his second voyage in June 1773.

The principal question in the minds of Cook, Banks, Green, and common sailor alike, remained whether New Zealand was part of a southern continent. Though well aware that modest islands had occasionally tricked even seasoned navigators into believing that a continent had been discovered, New Zealand had already proven to be more major a south Pacific land than any other known east of Australia. The mystery motivated Cook to set out in a rowboat and climb a hill to survey the area from a height, from which, on January 22, 1770, he found his answer: open ocean was seen to the east. The part of New Zealand that they had coasted thus far was an island. But could the land to its south, on which they now stood, be the austral continent?

Cook gleaned what he could from an old man on a small island named Motuara. The land to the east of the strait (North Island) was called "Aeheinomouwe," the man informed him, and many moons were required to sail around it. Circumnavigating the other island, called "Tovy-poenammu," was also lengthy—by which he was of course also telling Cook that it was not a continent.

In early March, the *Endeavour* was ready to return to sea. The strait named for Cook was crossed, and the North Island coasted long enough to convince all onboard that it was an island. They then set about mapping the South Island, which proved even more formidable a task, principally due to the foul weather which repeatedly blew them away from the coast and caused havoc with their sails. By the end of March, they had sailed around the South Island, dealing yet another blow to the quest for an austral continent. Tovy-poenammu was indeed insular, as the old man on Motuara had described to them.

Although the weather had prevented their surveys of the southern island from achieving quite the same precision as with its mate to the north, the resulting chart was an extraordinary accomplishment. Unlike other shores, knowledge of which had evolved in bits and pieces over many years and numerous voyages, Cook had in less than half a year transformed the map of New Zealand from the western coast cursorily mapped by Tasman, to a detailed chart of its entire coastline of both major islands.

"I shall point out such places as are drawn with sufficient accuracy to be depended upon, and such as are not," Cook advises in his journal of the chart's strengths and weaknesses. The coast between Cape Pallisser and East Cape "I believe to be laid down pretty accurate both in its figure and the Course." As for the region from East Cape to Cape Maria van Diemen, "altho it cannot be perfectly true yet it is without any very material error;" but from Cape Maria van Diemen "up as high as the Latitude of 36° 15' we seldom were nearer the Shore than from 5 to 8 Laegues and therefore the Line of the Sea Coast may in some places be erroneous."

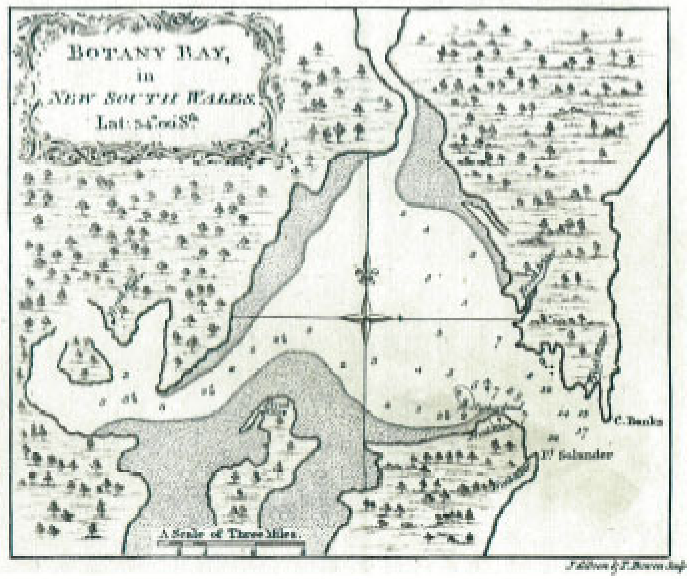
He was less confident about his mapping of the South Island, "Tovy-poenammu." "The Season of the year and circumstance of the Voyage would not permit me to spend so much time about this Island as I had done at the other and the blowing weather we frequently met with made it both dangerous and difficult to keep upon the Coast." Indeed, he had missed the strait separating Stewart Island from the mainland, and thus rendered it a peninsula and, conversely, not realized that his Banks' Island is really a peninsula (Banks Peninsula, near Christchurch).

Cook's basic mission had now been completed, so attention turned to choosing a return path home. The route via Cape Horn would have allowed them another chance at the nagging question of Terra Australis, but it was the end of March and the onset of winter, a foolish time to venture into such high latitudes. Safer would be to sail west for the Cape of Good Hope. That route would make their voyage a circumnavigation, and also afford an opportunity to investigate another unknown—eastern Australia.

Together with his officers, Cook decided to continue west and around Africa, but rather than follow the known route above New Guinea, they would do what previous navigators had prudently avoided: they would sail straight for the still unknown eastern coast of New Holland. Nothing beyond what Vincenzo Coronelli marks on this globe gore was known (Fig. 124); Tasmania sits by itself on the south, and the western coast of the Cape York Peninsula hangs coyly below New Guinea. Everything between southeastern New Guinea and northeastern Tasmania was a mystery.

They opted to begin at the Tasmanian coast, about where Tasman had left off. Tasmania lies not just south of southeastern Australia, but also west; Tasman, however, had erred about three degrees to the east in his placement of Tasmania, and thus upon reaching the area, Cook, even allowing for a SW-NE contour to the coast, was surprised to see no trace of it to the south. He left behind for the moment the question of Tasmania's relationship to Australia—a mystery which eluded him to the end—and began the maiden charting of the eastern coast of Australia.

Fig. 126. Cook's map of Botany Bay, New South Wales. From Hawkesworth's *Voyages,* London, 1773. [Antipodean Books, Maps & Prints]



Sailing northward, in late April 1770, a comfortable bay was discovered for the expedition to resupply and examine the country. Here the vast cultural "distance" between Australia and Polynesia became evident. The Australians spoke a language altogether unrelated to that of Tupaia. Aside from minor protestations to the landing, the Australians reacted with seeming disinterest to the strange visitors, and perhaps most alien of all, demonstrated no interest in acquiring iron, which had proven universally coveted among Polynesians. They named the place Stingray Harbour after the bountifulness of that animal in its waters, but then changed the name to Botany Bay (Fig. 126) after the rich cache of exotic plant specimens collected by Banks. Another bay just north of it they named Port Jackson, and toward the end of May they reached a large, open inlet, near what is now Brisbane, which they named Bustard Bay after the birds they saw there.

It was from this point that their woes began. The *Endeavour* was in need of maintenance, and her passengers in need of fresh water. Shoals, reefs, and islands began to punctuate the sea, the country became less fruitful, and a two-day reprieve in what they dubbed Thirsty Bay failed to yield water. The good news—or so they thought at the time—was that the moon was so brilliant that it let them risk sailing through the night, a practice which a cautious navigator like Cook would normally have avoided in unfamiliar waters. But unknown to them, they were slipping inside the Great Barrier Reef, and by sailing northward into it they were being drawn into a great natural trap, a funneling lair.

As the sun set on June 10, 1770, what appeared to be rocks or shoals were sighted, so Cook opted to hold his position until morning. This would also allow him to look for Quiros's shores, "which some geographers for what reason I know not have thought proper to tack to this land." Although water depths were wildly inconsistent, the sea was smooth, and they did not seem to be in immediate danger. But shortly after everyone except the watch had retired, in high water, the *Endeavour* struck a razor-sharp coral reef.

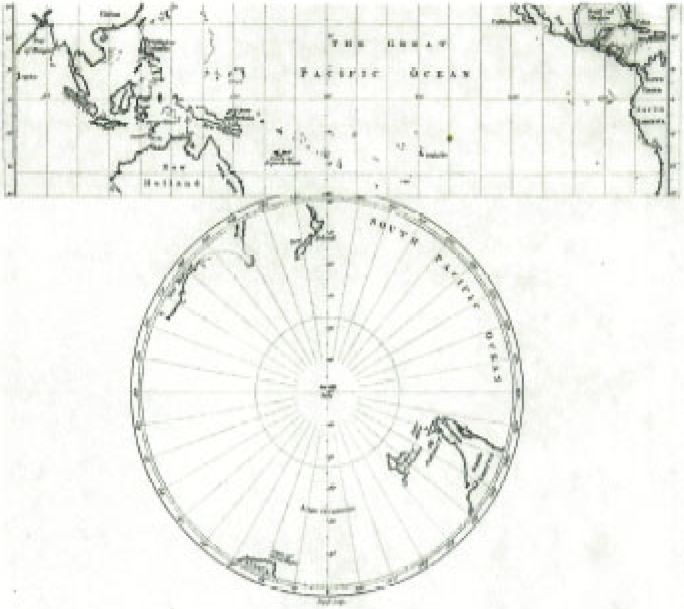


Fig. 127. Produced privately by Joseph Banks in 1772, this first printed map to show Cook's first voyage was never published. [Robert and Mary Anne Parks]

Two drastic measures were taken to enable the ship to limp to shore: whatever could be spared was tossed overboard, and then a tricky operation was performed in which a sail with wool and oakum was layered with dirt and dragged under the ship, so that the mixture would be drawn into the damaged hull and plug its leaks. The expertise of the crew, Cook's level-headedness, and the lucky happenstance that a piece of coral had broken off and effectively plugged the hole it had caused, saved the expedition. Boats were sent to locate a suitable landing place on the Australian mainland, and the vessel was repaired as best possible. Yet their mapping endeavors did not slacken from the emergency; the landings longitude was measured by astronomical means while there.

Avoiding further calamity henceforth did, however, inhibit the accuracy of their mapping of Australia. Freeing themselves from the clutches of the Great Barrier Reef allowed them to head for the relative safety of the East Indies, but kept them too far from the coast to continue charting it properly. With the *Endeavour* in a more precarious state than even they knew, they limped through the Torres Strait and settled the question of New Guineas insularity, then continued westward below the chain of Indonesian islands, and north through the Sunda Strait to Batavia.

While in Batavia awaiting completion of the repairs to the *Endeavour,* Cook entrusted copies of three charts composed during the voyage to officials of a Dutch fleet bound for home, which they agreed to get to the Royal Society: that of the "South Sea," of New Zealand, and of New South Wales. Thus the expedition's most significant cartographic contributions reached home before the explorers themselves.

Cook reached England in July 1771, bringing his country a wealth of new geographic and ethnographic data, and the glory of an impressively successful circumnavigation. Maps prepared during the voyage appeared in engraved form in Hawkesworth's *Voyages.* But the first printed map of the voyage was never published, having been privately produced by Banks in 1772 (Fig. 127). The map depicts the east coast of Australia for the first time, and records the name New South Wales.

The Second Voyage

Cook's first voyage had eroded the credibility of a great southern continent, but not categorically disproved it. The settling of the question became the primary objective of a new expedition for which Cook was given two ships, the *Resolution,* which he commanded, and the *Adventure,* under Tobias Furneaux, who had sailed with Wallis. They now carried chronometers, one on the model of John Harrison, the eccentric genius who developed them, and three on other models. The new devices had the attention of the mapmaking and scientific community, as they held the promise of determining the longitude of Pacific landfalls with unprecedented accuracy. All four were calibrated at Plymouth just prior to their departure on July 13, 1772.

Approaching the Pacific via Africa, the opposite end as the first voyage, the fleet stopped at the Cape of Good Hope to refresh and recalibrate the chronometers. While there it was learned that France's Admiral Kerguelen had discovered land in 48° S latitude, roughly in line with the longitude of Mauritius—the insinuation being that it might be part of the southern continent.

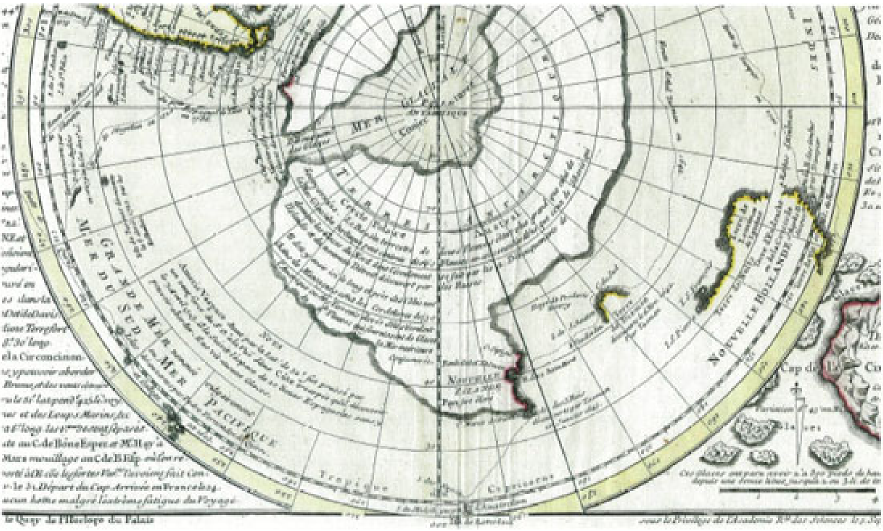


Fig. 128. A detail of Buache's map of the southern hemisphere. Though dated 1754, it is emended to include voyages through 1756.

Upon leaving the Cape, however, Cook's first goal was to investigate another purported tip of the austral continent, that sighted by Bouvet, Cape Circumcision. Gales made Bouvet's coordinates impossible to approach, but by passing 95 leagues further south, Cook showed that it was not part of a southern continent. The shores sighted by Kerguelen were the next project; but the longitude assigned by Kerguelen was wildly inaccurate, so Cook found no trace of his glaciated, fjord-indented island.

Astronomical observations were only rarely possible due to the overcast skies. Livestock died from the cold, the crew were showing signs of scurvy, and the ships were in constant danger of the ice. But for their perseverance they became the first humans to cross the Antarctic Circle, and their sweep of the high latitudes was sufficiently wide to expunge the ghost of Terra Australis from the Indian Ocean and westernmost Pacific. Later, Cook would revisit the icy seas and drive the final nails into the austral continent's coffin; but for the moment, having penetrated to *67°* 15' S, they had pushed their expertise, endurance, and luck to their limits. The two vessels had become separated in the thick fog and difficult seas, so both turned independently toward warmer climes for an ultimate rendezvous in New Zealand.

En route, both Cook and Furneaux tried to solve the riddle of Tasmania's relationship to Australia. Adverse winds foiled Cook's attempt to reach Tasmania whatsoever; he took the *Resolution* to Dusky Sound on the southwest extreme of New Zealand's South Island, having sailed 3660 leagues in 117 days without any glimpse of land. Furneaux reached Tasmania, and added to existing charts the small islands off its northeast coast now named for him, but similarly failed to settle the principal question. After refreshing in Adventure Bay, he followed the eastern Tasmanian coast north until the land veered westward into what his officers correctly suspected to be a strait, but which Furneaux himself believed to be a bay. Further reconnaissance being inhibited by the winds, sails were set for Queen Charlotte's Sound in New Zealand.

Cook and the *Resolutions* crew passed some peaceful weeks in Dusky Sound, maintaining cordial relations with the Mamoe people, who had been driven south by the militarily superior Maoris. William Wales, the expedition's principal astronomer, had a bluff cleared to set up an observatory to check longitude, and Richard Pickersgill made a map of the bay.

From Dusky Sound, Cook sailed north to the Cook Strait, where he found the *Adventure* in Queen Charlotte's Sound. Cook had intended to return to Tasmania, but as the winds continued to be unkind to the venture, he trusted Furneaux's instinct that it was part of New Holland.

While in Queen Charlotte's Sound, Cook was informed by his astronomers of what they believed to be a significant error in the longitude assigned the spot on the chart of New Zealand made on the first voyage—disconcerting news, since it probably meant that the entire landmass was wrongly placed. The astronomer William Bayly calculated their longitude to be 173° 48' 551/2', fully 1° 20' west of the figure reached by Cook and Green three years earlier. Wales used the chronometers to extrapolate from his reading for Dusky Bay and reached a figure similar to Bayly's. Subsequent readings showed these figures to be flawed as well, but in the end Cook acknowledged that "it appears that the whole of *Tavaipoenammoo"* by which he referred to the South Island, "is laid down 40' too far East," half of the error originally calculated, but still an error of about 55 kilometers at the latitude of Cook Strait.

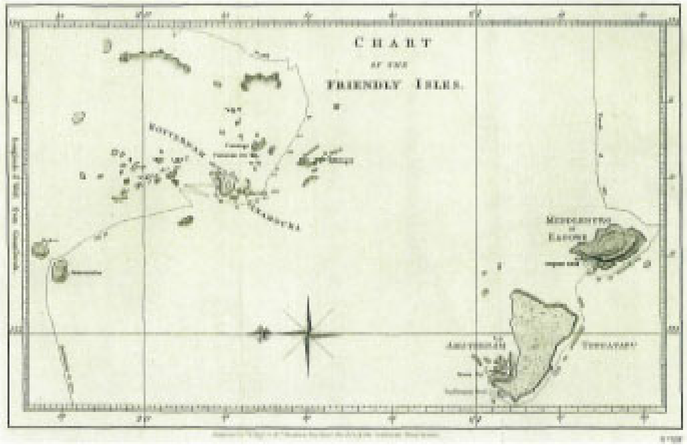


Fig. 129. The southern Tonga Islands as mapped by James Cook on his second voyage, published in 1777. [Lahaina Printsellers, Ltd]

Next they embarked upon the first of two southern sweeps through the central and eastern Pacific in search of the austral continent. Just as the *Resolution* cleared the Cook Strait, one of her chronometers gave out, though the one built on Harrison's design continued to be reliable. They gently zig-zagged east through 133° W longitude, but not having found any continent Cook turned north, skirted the Tuamotus, and reached Tahiti.

Since many of the crew were sick and in urgent need of fresh food and rest, Cook first anchored in closer Vaitepiha Bay rather than Matavai Bay. He found the island beset by internal warring— his own presence figured into the indigenous politics, as did the effects of intervening European voyages, notably one out of Peru. Spain was alarmed at the discovery of a fruitful island in what it still considered its private ocean, and indeed the plethora of undetermined south Pacific Spanish landfalls on charts has been used to "prove" earlier Spanish discovery of Tahiti.

Supplies in Vaitepiha being disappointing, Matavai became their destination after a week, and after that the neighboring islands of Huahine and Raiatea. Cook noted an error on his earlier chart's delineation of Raiatea and corrected it.

In order to "avoid the tracks of former Navigators" and to investigate islands discovered by Tasman over a century earlier, Cook sailed west for Tonga. Ironically, a principal impetus in Cook's actions was a book written by the man who, had history played itself out at a different moment, would have led these expeditions rather than Cook, and the man whose dreams of an attractive southern continent Cook was presently debunking— Alexander Dalrymple. Dalrymple's *Historical Collection of Voyages* provided Cook a record of the voyages of Quiros and Tasman, among others, along with Dalrymple's own opinions as to the locations and identities of various discoveries.

Sailing generally west, after a week he sighted Maupiti, the westernmost of the Society group. On September 23, an island was discovered in about the spot where Dalrymple's volume placed an island Quiros had named La Dezena, but Cook, probably correctly, doubted Dalrymple's interpretation. This was Hervey Island, part of the group now named for Cook. A week later, an island was sighted which was correctly identified as the Middelburg ('Eua) of Tasman, and the following day, sailing just south of it, Tasman's Amsterdam (Tongatapu).

The Tonga Islands were discovered relatively early. The northernmost extreme of the Tongas had been seen by Le Maire in 1616. Tasman had enjoyed his visit to the southern isles in 1643, and Wallis skirted the archipelago on the north in 1767. Cook now began the formal mapping of the archipelago. The map he produced (Fig. 129) was rougher than his other efforts, even Tongatapu and 'Eua being depicted rudimentarily. But Tonga was more of a challenge than Tahiti and less of a priority than New Zealand.

'Eua was the first of the group Cook visited. The people were gracious and hospitable, the island serene, its fruit freely offered; but trade in the island's hogs and poultry could not be established, so Cook crossed to Tongatapu, where the *Resolution* was generously restocked. The English visitors were awed by the uniform gardenlike image of Tongatapu, as they had been impressed by the wilder aspect of'Eua, its lower garden contrasting the "beautiful disorder" of the interior. Here the mapping of the Pacific nearly took a loss to islanders' thieving when a Tongan man burst from the *Resolutions* master's cabin with an armful of navigational books.

Now early October 1773, Cook set out for New Zealand, passing Tasman's Pylstaart (Ata) en route. The fleet was separated in a dreadful storm off New Zealand, the two vessels then unable to find each other, so Cook left a message in a bottle buried beneath a marked tree and left the comfort and safety of Oceania for another tortuous hunt for the ghost of a Pacific Terra Australis. The *Endeavour* sailed generally southeast, crossing the Antarctic Circle, returned north briefly, then made one final, dramatic plunge to the south to 71° 10' S, where a solid wall of pack ice made further advancement impossible. They could now confidently report that the austral continent that had been the single greatest impetus for Pacific exploration for two and a half centuries did not exist.

Cook's descent to beyond 71° would be a challenge even for a modern vessel. For him to have navigated through those seas, deadly ice all about, fickle and violent winds, compounded by sails and ropes which were so impregnated with ice as to be like rock, was altogether extraordinary. And although Cook did not discover Antarctica, he was frequently well south of much of that continent's shore—he was just never far enough south at the right longitude.

Returning north, Cook debunked another Pacific land championed by Dalrymple, supposedly discovered by Juan Fernandez, and then made for Easter Island. The coordinates of Easter Island had not yet been laid down accurately, but when the crew beheld the island's unique statues glaring at them, there was no question that they had reached the land described by Roggeveen. Their visit was agreeable and the island's position was plotted. Provisions, however, were scarce.

But Cook carried with him a chart by Dalrymple (Fig. 130) showing four islands purportedly lying to the northwest of Easter Island which might supply all they needed. These were the southern Marquesas—Fatu Hiva, Motane, Hiva Oa, and Tahuata—which had lay undisturbed by European guests since their discovery by Mendafia in 1595. Ascertaining their coordinates accurately might, Cook rightly believed, help locate other enigmatic early Spanish discoveries further west. The Marquesas, though having so rarely adorned published maps, had been gaining credibility: de Fer in 1713 (Fig. 13), Nolin in 1740 (Fig. 68), and Buache in 1754 (back endpaper), similar to Dalrymple's mapping.

Since Cook could trust that the latitude recorded by Mendana for the Marquesas would be close to actual, but knew that any estimate of leagues from Peru was far too rough to gauge longitude, he sailed to the latitude Mendana assigned, 9° 30' S, but east of any reasonable estimate of their longitude, and then turned due west. On March 29, 1774, "being in latitude 10° 20', longitude 123° 58' W.," Cook altered his course to reach "latitude 9° 24', which I judged to be the parallel of the Marquesas; where, as I have before observed, I intended to touch, in order to settle their situation, which I find different in different charts." On April 6, a sixteen-year-old midshipman named Hood sighted an island (Fatu Huku), and then to the south the four isles recorded by Mendana were found. Cook wrote that Dalrymple's map proved to be "deficient in nothing but situation," it having placed the four known Marquesas at 145° W longitude, about six degrees too far west. The latitude Dalrymple had ascertained from his sources was near perfect.

Cook's survey (Fig. 131) preserves Mendana's names for the original four Marquesas and bestows upon the new one the name of its teenage discoverer. Cook specifically sought, and mapped, the port where Mendana had stopped, Madre de Dois (Vaitahu, along western Tahuata), even locating a little waterfall mentioned by Quiros. Here he did change the original European name, dubbing the bay after his ship, the *Resolution.* If his delineation of the islands was still imperfect, his determination of Vaitahu's coordinates was excellent—about 4 kilometers too far west. The prominence of the Marquesas included by Zatta on his map of 1776 (Fig. 115) was probably inspired by news of Cook's rediscovery of the islands, without yet drawing from his map.

Fresh meat was not to be had, but fruits, vegetables, and water were obtained. The people were accommodating and beautiful— the most physically beautiful people they had ever seen, eclipsing even those of Tahiti. "The inhabitants of these islands," the account relates, "collectively, are without exception the finest race of people in this sea. For fine shape and regular features, they perhaps surpass all other nations."

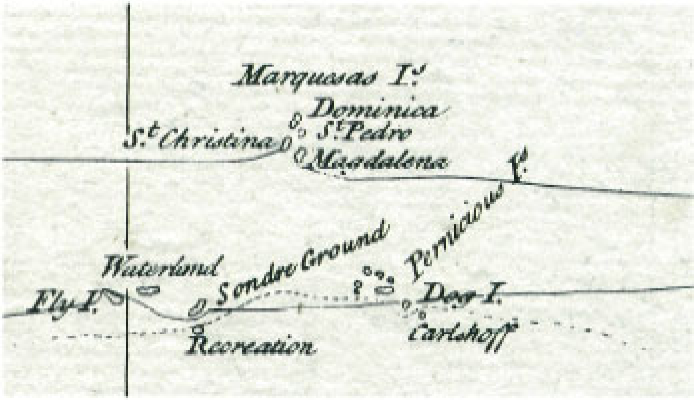
From the Marquesas the expedition returned to Tahiti once again, trying to make a landing at the Tuamotus en route but deterred, as had other Europeans before them, by unreceptive islanders. Huahine and Raiatea were visited again, and then sails were set to continue west for Tonga. As on their first trek from the Societies for Tonga, one of the Cook Islands was discovered, this time Palmerston. Next Niue was discovered, named by Cook "Savage Island" on account of the cloud of spears and stones greeting them when they attempted to land.

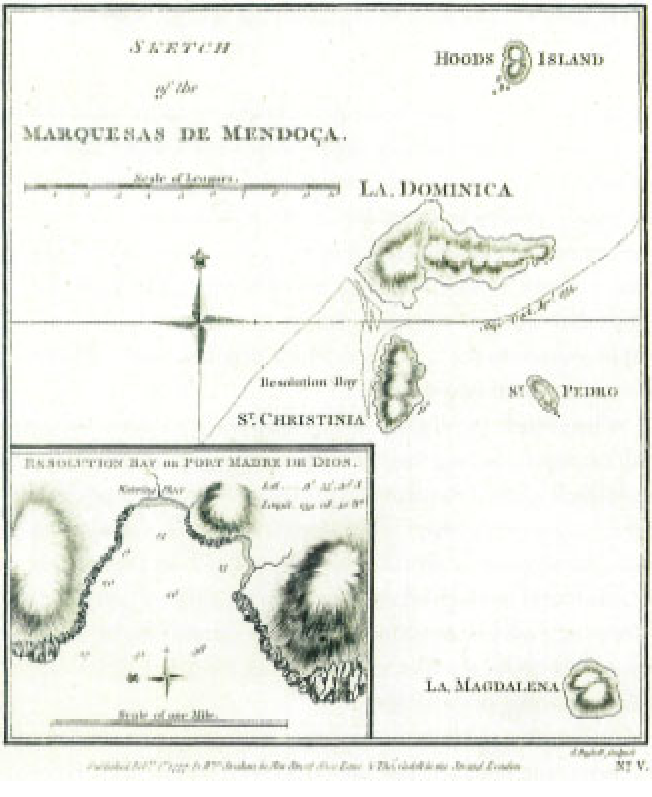
But Cook's true purpose on this leg of his route lay beyond Tonga, in a part of the ocean where Quiros had found his "Australia del Espiritu Santo" and Bougainville his "Great Cyclades."This was Vanuatu, or as Cook called the islands, the New Hebrides. Quiros had approached the group from the north (1605), and Bougainville sailed through from east to west (1768). Cook reached the archipelago in July 1774, close to Bougainville's tracks, though approaching from south of Fiji.

In six weeks of weaving his way through the island complex, Cook produced one of the most remarkable surveys of his career, charting the group from Tanna and little Anatom on the south, through Espiritu Santo on the north. Here Cook also delineated part of Oceania's ethnographic "map," noting that he seemed to be in a crossroads of cultures—Vanuatu is a frontier between Polynesia and Melanesia. The islanders at his first attempts at landfalls, in Melanesian Malekula and Erromanga, were not welcoming; friendly relations were, however, established on the Polynesian island of Tanna, despite unwarranted violence on the part of Cook's crew.

Wales took many sets of observations to fix each point; in southeast Malekula, the mean of 32 sets, in Tanna, 45 sets. In Tanna, Wales's frustration caused by the standards to which he held himself became evident: "I begin to despair," he wrote of his attempts to take altitudes accurately enough to check the chronometer, "of doing any thing to the Purpose here, and yet I am such a slave to it that I have scarce time to eat." His perfectionism was not wasted: despite its flaws, the chart Cook composed from his readings was still being used for some of the islands in the late nineteenth century. Cook believed he was applying to the individual islands their indigenous names. Many, however, such as "Tanna," simply referred to the land upon which people stood— they had no name for their island per se.

Above: Fig. 130. The Marquesas as reconstructed by Alexander Dalrymple before Cook's rediscovery of the archipelago on his second voyage. From *Voyages in the South Pacific Ocean,* 1770. *Belour.* Fig. 131. The Marquesas, from the narrative of the second voyage of James Cook, 1777. [Lahaina Printsellers, Ltd]


Marquesas I.s
Dominica
S.t Christina
S.t Pedro
Magdalena
Pernicious I.
Waterland
Fly I.
Sondre Ground
Dog I.
Recreation
Carlshoff


SKETCH
of the
MARQUESAS DE MENDOÇA.
Scale of Leagues.
HOODS ISLAND
LA. DOMINICA
Resolution Bay
S.T CHRISTINIA
S.T PEDRO
LA. MAGDALENA
RESOLUTION BAY or PORT MADRE DE DIOS.
Watering Place
Scale of one Mile.
N.o V.

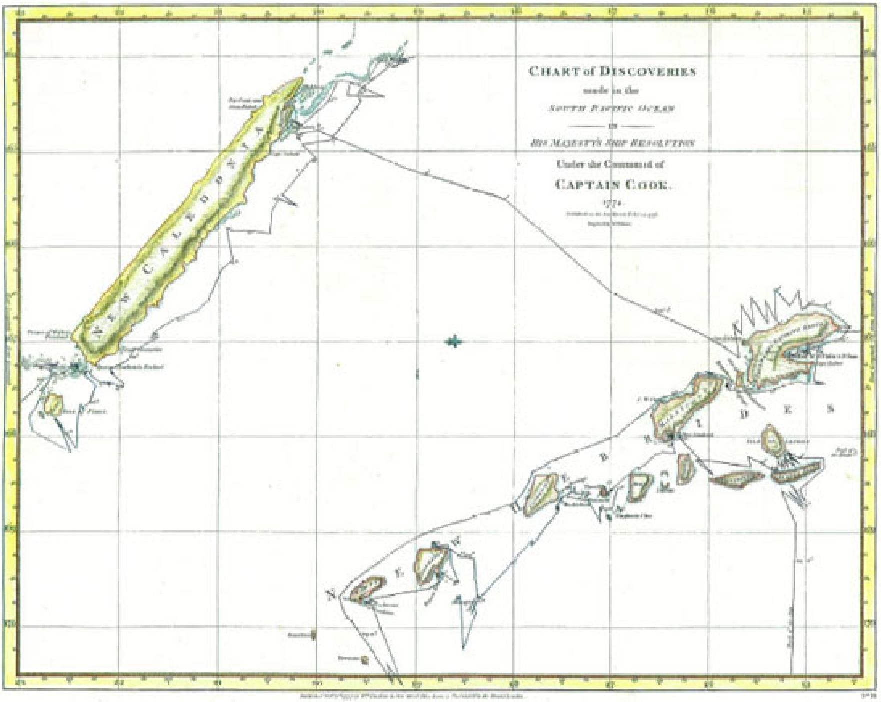


Fig. 132. James Cook's chart of New Caledonia and Vanuatu (New Hebrides), 1777. West is at the top. [Lahaina Printsellers, Ltd]

Sailing south and slightly west from Vanuatu toward New Zealand, on September 4 a vast, unknown coast appeared, guarded by coral which seemed to surround the entire island yet stayed close to the surface of the water. They were at the northeast of New Caledonia. An eclipse was expected on September 7, so a channel in the reef was found to reach an anchorage on an offshore islet. The New Caledonians were unarmed, shy, and very courteous. An observatory was set up on the islet, though clouds hindered Wales's view of the beginning of the eclipse.

Cook took a party onto the main island and up to the summit of a mountain, where he saw the ocean on the other side. Hence he knew that the island was narrow, and although he never reached its western coast, he was able to make a reasonable guess in delineating it on his map. A party sent out on boat believed, correctly, that the northern end of the island was near, so Cook tried to circumnavigate counter-clockwise. However, the extensive reefs and unpredictable winds made him turn around and sail south, mapping the coast through the Isle of Pines.

The only remaining task for Cook was to search for the southern continent in the Atlantic, which he did en route back to England after rounding Cape Horn. This second voyage of Cook ranks among the greatest exploratory voyages of all time. In its scope, distance traveled, and risks taken, the odyssey dwarfed those of the already formidable first voyage.

The Third Voyage

Whereas the high southerly latitudes were the focus of the second voyage, the northern Pacific latitudes were the principal object of the third. The discovery of Hawaii, for which that voyage is perhaps best known, was a happy accident en route from the Society Islands to the Northwest Coast of America. And whereas on the second voyage, it was hoped that a continent would be discovered in the far south, on the third it was hoped that open sea would be discovered in the far north.

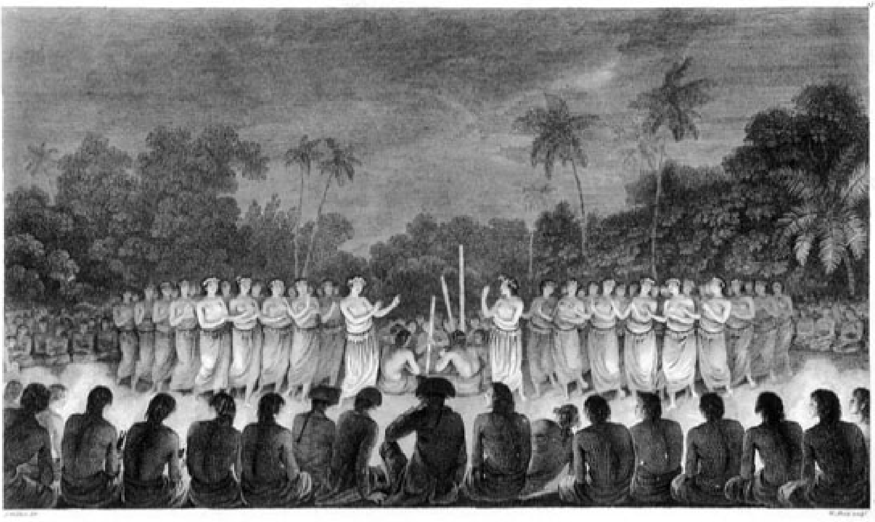


Fig. 133. An engraved rendering of John Webber's drawing of a dance by women on the Tongan island of Lifuka, from Cook's third voyage, 1784. About a quarter hour into a concert by eighteen men, "twenty women entered the circle. Most of them had, upon their heads, garlands of the crimson flowers of the China rose, or others; and many of them had ornamented their persons with leaves of trees, cut with a great deal of nicety about the edges. They made a circle round the chorus, turning their faces toward it, and began by singing a soft air, to which responses were made by the chorus in the same tone; and these were repeated alternately. All this while, the women accompanied their song with several very graceful motions of their hands toward their faces, and in other directions at the same time, making constantly a step forward, and then back again, with one foot, while the other was fixed. They then turned their faces to the assembly, sung some time, and retreated slowly in a body, to that part of the circle which was opposite the hut where the principal spectators sat. After this, one of them advanced from each side, meeting and passing each other in the front, and continuing their progress round, till they came to the left. On which, two advanced from each side, two of whom also passed each other, and returned as the former; but the other two remained, and to these came one, from each side, by intervals, till the whole number had again formed a circle about the chorus. Their manner of dancing was now changed to a quicker measure, in which they made a kind of half turn by leaping, and clapped their hands, and snapped their fingers, repeating some words in conjunction with the chorus. Toward the end, as the quickness of the music increased, their gestures and attitudes were varied with wonderful vigour and dexterity." Cook then confided that "some of their motions, perhaps, would, with us, be reckoned rather indecent," though he speculated that they were merely "to display the astonishing variety of their movements." If the information gathered by William

Mariner in Tonga over three decades later is accurate, the display was a ruse by a chief, Finau, to distract and slay the English. No attack ever came, supposedly because of internal rivalries.

Europeans had since the late fifteenth century attempted to sail to the Orient via northern seas, and the effort had received new energy during the eighteenth century. The Admiralty arranged for Cook to attempt to round North America from the Pacific as another expedition did so from the Atlantic—the hope being that the two would meet each other along a viable northern passage, such as mapmakers had theorized for two and a half centuries.

Aside from that remarkable task, his instructions were routine. "At whatever place you may touch in the course of your voyage," they read, "where accurate observations of the nature hereafter mentioned have not already been made, you are, as far as your time will allow, very carefully to observe the true situation of such places, both in latitude and longitude." He was to "survey, make charts, and take views of such bays, harbours, and different parts of the coast, and to make such notations thereon, as may be useful either to navigation or commerce." The mapping was not to be limited to the geographic outlines of islands, but rather should include "the variation of the needle; bearings of head-lands; height, direction, and course of the tides and currents; depths and soundings of the sea; shoals, rocks, &c."

Cook left on July 12, 1776 in the Resolution. The expedition was a fleet of two, but the other vessel, the Discovery, was delayed until August 1 because her captain, John Clerke, was in debtors' prison for having guaranteed a bad loan of his brother's. After the two vessels were united at Cape Town, they made such excellent time into the Pacific that Cook found himself with a year of free time for general exploration before the attempted rendezvous above America—time, it would seem, for him to pursue the voracious exploration for which he had become justly famous.

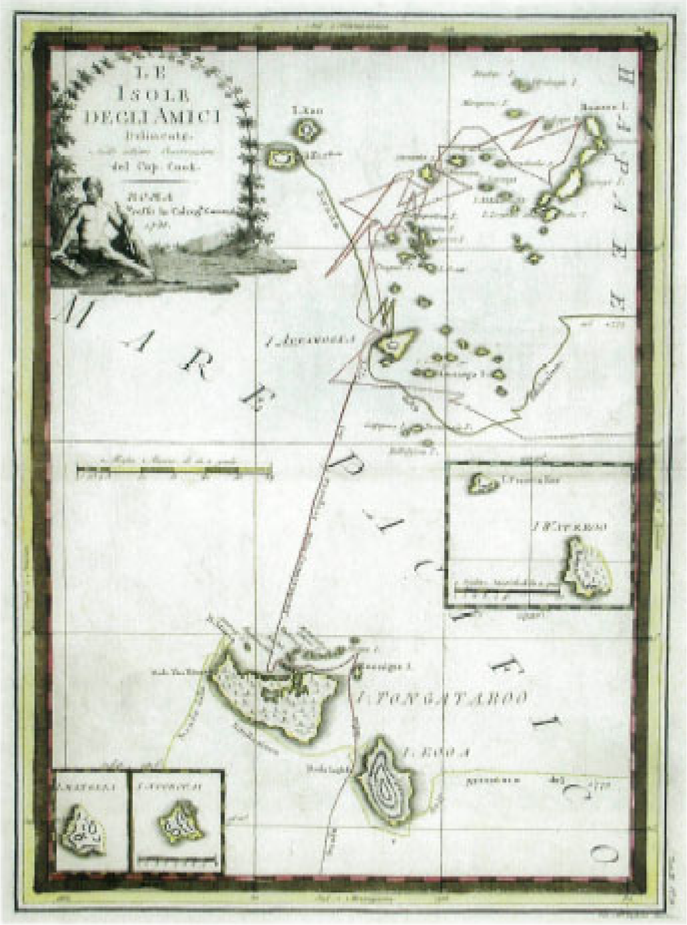


Fig. 134. The southern Tonga islands, based on the maps from Cook's second and third voyages, by Cassini, 1798. [Kauai Fine Arts]

When, on January 26, 1777, Cook reached Tasmania, the island was still presumed to be part of Australia. Cook's attempts to settle the issue during his previous two voyages had been thwarted by uncooperative winds, but now he simply mentions the apparent similarities of language between the Tasmanian people and those of northern Australia, without any evident lust to settle the geographic question empirically Here it can fairly be said for the first time that Cook did not well serve the advancement of the mapping of the Pacific. The erroneous linking of Tasmania and Australia remained on charts until 1798, when George Bass and Matthew Flinders sailed through the strait separating them, and a chart of their voyage was published by Dalrymple.

From Tasmania, the expedition sailed to New Zealand, where more astronomical observations were made in Queen Charlotte's Sound. Tahiti was the intended next landing, but the winds made that an impossible target. Cook altered their course, bringing them to Mangaia, southernmost member of the Cook group. Though in need of reprovisioning, the lack of any safe anchorage forced them to leave "this fine island, which seemed capable of supplying all our wants." Sights were set for bountiful Tonga, to which the present winds seemed happy to lead them. Frequent reprovisioning was essential because the *Resolution* was filled with sundry animals; Cook once joked that the *Discovery* was a veritable Noah's Ark save for the want of female humans.

After reaching Tonga in mid-April, however, there was no want for the fair sex of our species aboard their arks. Through mid-July, the company enjoyed what might be described as a working vacation, and the mapping endeavors of the expedition again begin to disappoint the superhuman expectations set by Cook's previous voyages. Despite repeated reports of other major groups in the vicinity, notably Fiji to the northwest and Samoa to the north-northeast, no effort was made to "discover" and survey them. Why did Cook, the tireless, obsessive explorer and mapmaker, suddenly vacation for three and a half months in Tonga without attempting to investigate the archipelagos of which he was being informed? His own text seems strangely detached from the question: "Under the denomination of Friendly Islands, we must include, not only the group at Hapaee, which I visited, but also … others that have never been seen, hitherto, by any European navigators…. According to the information that we received there, this Archipelago is very extensive. Above one hundred and fifty islands were reckoned up to us by the natives, who made use of bits of leaves to ascertain their number; and Mr. Anderson, with his usual diligence, even procured all their names. Fifteen of them are said to be high, or hilly, such as Toofoa, and Eooa; and thirty-five of them large. Of these, only three were seen this voyage…. Sixty-one of these islands have their proper places and names marked upon our chart of the Friendly Islands, and upon the sketch of the harbour of Tongataboo, to both which I refer the reader. But it must be left to future navigators, to introduce into the geography of this part of the South Pacific Ocean, the exact situation and size of near a hundred more islands in this neighbourhood, which we had not an opportunity to explore; and whose existence we only learnt from the testimony of our friends, as above-mentioned."

Cook then goes on to actually name Samoa *(Hamoa),* Fiji *(Feejee),* and the northern Tonga island of Vava'u: "But the most considerable islands in this neighbourhood, that we now heard of (and we heard a great deal about them), are Hamoa, Vavaoo, and Feejee. Each of these was represented to us as larger than Tonga-taboo. No European, that we know of, has, as yet, seen any one of them." This was, of course, not true.

He should have visited Vava'u, he explains, but had first been misled to believe that it was small and without a good harbor, until King Paulaho corrected him (and even offered to accompany him there). Cook's own comments on Samoa also beg an explanation for his failure to visit them: "Hamoa [Samoa], which is also under the dominion of Tongataboo, lies two days sail North West from Vavaoo [Vava'u]. It was described to me, as the largest of all their islands; as affording harbours and good water; and as producing, in abundance, every article of refreshment found at the places we visited. Poulaho [King of Tonga], himself, frequently resides there. It would seem, that the people of this island are in high estimation at Tongataboo; for we were told, that some of the songs and dances, with which we were entertained, had been copied from theirs; and we saw some houses, said to be built after their fashion" (Fig. 110).

At the same time that Cook's cartographic zeal seemed to wane, so did his lauded patience and reserve in dealing with the islanders. Punishment to "thieves" was quick and untempered, to the point that many remembered him with hatred when Bruni d'Entrecasteaux visited Tonga sixteen years afterwards.

Cook did, nonetheless, keep refining his surveys of those Tongan shores they did visit. "The difference in longitude, between Annamooka and Tongataboo," Cook explained, "is somewhat less than was marked in the chart and narrative of my last [second] voyage." He then lays out the latitude of their observatory, located near the middle of the north side of Tongatapu, based on several observations, as being 21° 8' 19" S.—highly accurate. Longitude was determined to be 184° 55' 18" E, a figure derived from "one hundred and thirty-one sets of lunar observations, amounting to above a thousand observed distances, between the moon, sun, and stars." The figure was slightly too far east.

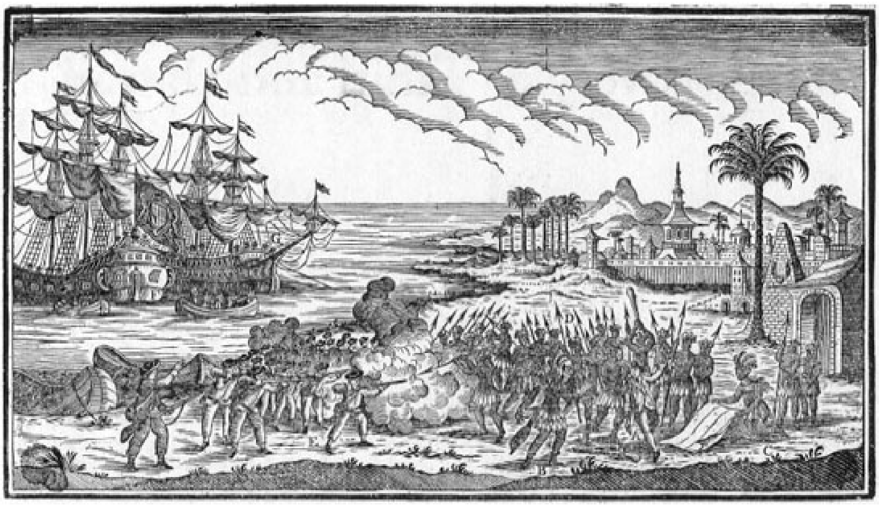


Fig. 135. Death of Cook, 1781. An early depiction of Hawaii and Cook's death, from a German newspaper article reporting word of the event. Borne of the reporter's imagination, pagodas mark the walled "Hawaiian" village, and the Hawaiian chief in the lower right wears an Amerindian headdress. One wonders what the artist has placed in his hands—tapa, or one of Cook's maps. Although the article refers Cook's death as "last year," which would date the view at 1780, it then erroneously refers to "1780" as the year of Cook's death (actually 1779), placing the view at 1781.

An attempt to check longitude by a solar eclipse on July 5 was marred by clouds, but "the disappointment was of little consequence, since the longitude was more than sufficiently determined, independently of this eclipse, by lunar observations" from Annamoka's observatory on the island's west side. "The difference in longitude," Cook continues, "made by the time-keeper," John Harrison's famous chronometer, "between the two observatories is 0° 16' 0"." He was perplexed by a marked decrease in magnetic variation at and near Annamooka than in its neighboring islands.

Cook sailed from Tonga in mid-July and reached Tahiti in mid-August, skimming the Austral island of Tubuai en route. Upon reaching Tahiti, Cook apprised himself of the island's latest political intrigue and on the increasing activity of the Spanish from Lima. Point Venus again became the site of astronomical observations. He continued on to Moorea, Huahine, Uliatea, and finally Bora Bora, an island he had never yet set foot on.

Seas and winds still kept Cook from anchoring on Bora Bora, but he made a hurried visit by boat and acquired part of the anchor lost in Tahiti by Bougainville—which he wanted not as an anchor, but from which to forge "hatchets, and other iron tools" to use as articles of trade. On December 8, feeling what one crew described as "the greatest regret," they sailed north to begin their search for a Northwest Passage, stumbling across Hawaii along the way.

After the return of the expedition in October 1780, nearly four years elapsed before the publication of the official narrative with its many charts and illustrations. News of the voyage spread quickly, however, and images conjured largely from imagination depicted the death of its celebrated commander in Hawaii (Fig. 135).

Intrigue and rivalry accompanied the publication of the official charts. The account of the voyage credits the lieutenant Henry Roberts with having prepared them, under Captain Cook's supervision, but William Bligh, in notes amended to the narrative, insists that only he and Cook were responsible for them. According to Banks, Lord Sandwich, after whom Hawaii had been named, asked that Alexander Dalrymple supervise the engraving of the charts and coastal profiles—all except the world [Roberts'] map, which was produced "under the sole direction of the Admiralty" and "cost a large Sum of money." The remaining charts, under Dalrymple's care, "were elegantly engraved at Reasonable prices."

The labors of two and a half centuries of mariners, combined with improved technology and theory, seemed finally to bud in the years leading up to Cook's voyages, the fruit ripe for his picking. Yet that fruit needed an extraordinary human being to harvest it. Had such a singularly remarkable man not been there for the task, his talents recognized by his superiors, the eleven years spanning 1768-79 would not have been the watershed they were.

Chapter 8

The Discovery of Tahiti and Hawaii

"It appeared to be a great high mountain covered with clouds at the top," wrote George Robertson, sailing master of Captain Samuel Wallis's *Dolphin* on June 19, 1767, at their first, distant image of Tahiti. At six the next morning, "we saw the tops of several mountains … this made us all rejoice and filled us with the greatest hopes Imaginable; we now looked upon ourselves as relieved from all our distresses, as we were almost Certain of finding all sorts of refreshment on this great Body of Land." Thus was the recorded European discovery of Tahiti.

What did they think they had found? "We now supposed we saw the long-wished-for Southern Continent, which has been often talked of, but never before seen by any Europeans," Robertson wrote. But the illusion had half-vanished by the next day: "We was not fully persuaded," Robertson noted after sailing further along its shores, "that this was part of the southern continent."

When the sun rose and fog lifted, her crew beheld "upward of a hundred canoes betwixt us and the breakers all paddling off towards the ship." This, their first close glimpse of the island and first impression of its people, was the morning of June 20, though the log reads June 19 because they changed the day at noon rather than midnight. (As late as 1825, the English captain Byron remarked that two Hawaiian teachers had been brought up in the United States, "where the Jewish method of reckoning time is observed, and the day begins and ends at noon".) The discovery of the bountiful island could not have been more fortuitous. Captain Wallis, the first lieutenant, and thirty other seamen were ill, some so bad that the doctor "expected Death to seize them soon, if timely relief was not found, on this pleasant and delightful country."

The English successfully communicated their desire to barter for hogs and chickens by imitating the noises of each. Canoes brought food supplies and trade was facilitated with that seemingly inevitable commodity of the Polynesians, nails. When the first Tahitian risked accepting the strangers' invitation to board their vessel, he was harshly kicked and fled back to the safety of the sea—the culprit a goat oblivious to the temporary diplomatic damage he had just caused.

"At sunrise," on the journal dated 24 June (i.e. June 25), "about three hundred canoes came off and lay round the ship, as many as could conveniently lay alongside traded very fair and took nails and Toys for their Hogs, fowls and fruit. By Eight o'clock there was upwards of five hundred canoes, round the ship, and at a Moderate Computation there was near four thousand men." Most of the trading canoes had among her passengers "a fair young Girl… who played a great many droll wanton tricks, which drew all our people upon the Gunwales to see them. When they seemed to be most merry and friendly some of our people observed great numbers of stones in every canoe. This created a little suspicion in several of our people, but the most of us could not think they had any Bad Intention against us. Especially as the whole traded very fair and honest, and all the men seemed as hearty and merry as the Girls."

Yet the English were leery of a quick landing. "Indeed I must own we had some reason to be a little afraid, for by the time we got close to the shore there was above two hundred great and small canoes round us, and near fifteen hundred men. As to the numbers that was on the shore, of men, women and children, it was impossible to form any idea of them, the whole Coast was lined with them as far as we could see."

The visitors' apprehension was justified. A crowd, probably under the direction of a local priest, did indeed attack the *Dolphin* with stones, to everyone's regret: the guns the English used to retaliate "struck such terror amongst the poor unhappy crowd that it would require the pen of Milton to describe…." But following that unfortunate episode, peaceable relations ensued. After scraping banks that now bear the vessel's name, the *Dolphin* safely anchored in Matavai Bay, which they named Port Royal. To the land itself they gave the name King George's Island. The crew privileged to the sole unspoiled European glimpse of Tahitian civilization stayed just over one month.

No detailed survey of the island was made, though a midshipman named Pinnock drew its rough outline (Fig. 137). On July 24, George Robertson consulted an astronomical almanac and realized that a solar eclipse would occur the following day over Mexico and Peru. He calculated that it should be visible at their present location as well, and that night regulated the watches in preparation. Early the next morning, Robertson and Pinnock went to shore with a dark glass scavenged from a sextant, a reflecting telescope, spy-glass, and watch, hoping to use the eclipse to fix the longitude of their new-found island. Pinnock was asked "to take the Altitude of the Sun, and work the true time of the Day." The eclipse was slight; Robertson mused that had it been dramatic, they could have gotten whatever they wanted from the Tahitians as Columbus had from the natives of Jamaica. Once the sun and moon yielded their clues, their longitude was determined to be 150° W, about 45 kilometers too far west as measured from Papeete—but respectable enough for a preliminary reading taken in unknown Pacific waters without a chronometer. Hawkesworth's *Voyages,* containing an account of the voyage written as though it were Wallis's words, simply records that on that morning "I [Wallis] took a guard on shore, and erected a tent on a point of land, to observe an eclipse of the sun, which, the morning being very clear, was done with great accuracy."

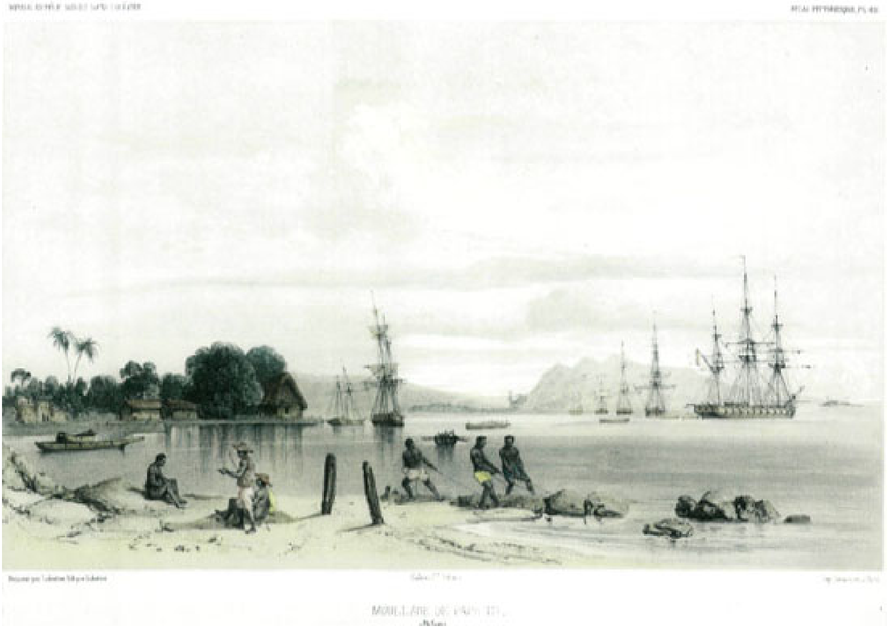


Fig. 136. *Mouillage De Pape Iti,* view of Papeete from d'Urville's *Voyages*. By Lemercier, 1830.

Not only did the English receive the finest fruits and meat to aid in recovery of their health, but also the therapeutic power of the island's hospitality. When some elderly Tahitian men observed that the young English sailors (most of whom were in their teens and early twenties), "could not help feasting their Eyes" on several nearby girls, they "made signs for our people to take which they liked best, and as many as they liked…. This piece of news made all our men madly fond of the shore, even the sick which had been on the Doctor's list… they were Certain of recovering faster under a Young Girl's care nor all the Doctor would do for them. We passed this Night very merry, supposing all hostilities was now over, and to our great joy it so happened."

A lively friendship ensued between the Tahitians and their exotic visitors. Nails quickly became the medium with which sailors thanked friendly girls, and soon two-thirds of the sailors were sleeping on deck for having given away their hammock nails. When some girls began exacting seven or nine inch spikes, the safety of the vessel itself was compromised and the romances interrupted.

The map of Tahiti produced by Pinnock was no more than a rough beginning to the surveying of the island, but its location was ascertained with sufficient accuracy, and its suitability for hosting European explorers amply demonstrated.

Tahiti was "discovered" again the following year by Louis Antoine de Bougainville (Fig. 138). "With joy we saw fires burning on every part of the coast, and from thence concluded that it was inhabited," he wrote. Many canoes approached the vessel, and one, "manned by twelve naked men" offered branches of banana, "and their demonstrations signified that this was their olive-branch…. As we ran along the coast, our eyes were struck with the sight of a beautiful cascade, which came from the tops of the mountains, and poured its foaming waters into the sea. A village was situated at the foot of this cascade, and there appeared to be no breakers in this part of the coast." Bougainville wanted to anchor "within reach of this beautiful spot," but the nature of the sea bottom forced them "to go in search of another anchorage." They found a suitable landing in Hitiaa Lagoon.

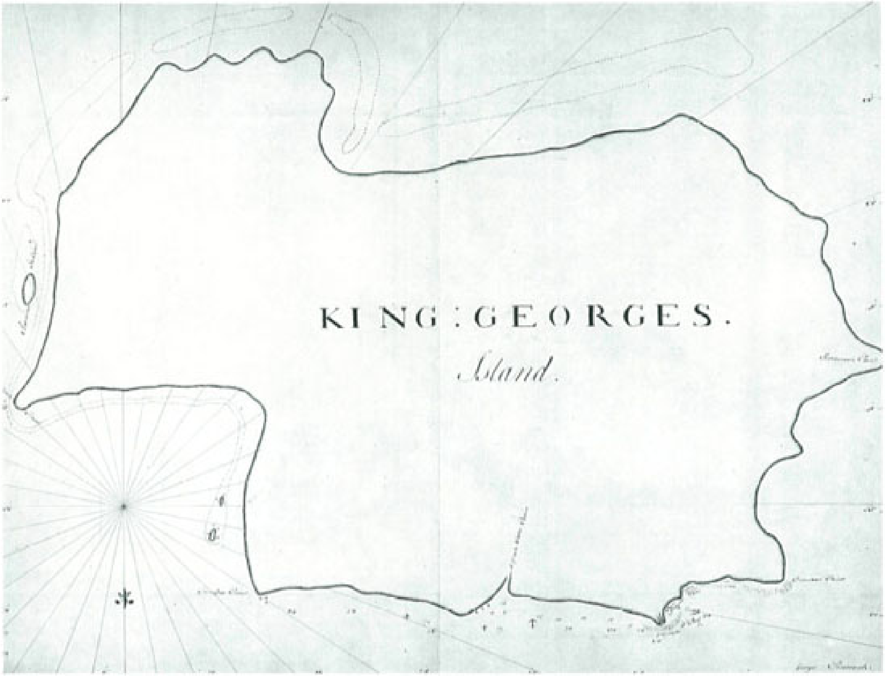


Fig. 137. Manuscript map of Tahiti, Pinnock, 1767. South is at the top, so Papeete is in the lower right. [British Library, Add MS 15499 £23]

Bougainville's account of his approach to Tahiti was so influential in creating the mystique of Polynesia that it is worthy of repeating extracts here: "As we came nearer the shore, the number of islanders surrounding our ships encreased. The periaguas were so numerous all about the ships, that we had much to do to warp in amidst the croud of boats and the noise. All these people came crying out *tayo,* which means friend, and gave a thousand signs of friendship; they all asked nails and ear-rings of us. The periaguas were full of females, who, for agreeable features, are not inferior to most European women; and who in point of beauty of the body might, with much reason, vie with them all. Most of these fair females were naked; for the men and the old women that accompanied them, had stripped them of the garments which they generally dress themselves in. The glances which they gave us from their periaguas, seemed to discover some degree of uneasiness, notwithstanding the innocent manner in which they were given; perhaps, because nature has every where embellished their sex with a natural timidity; or because even in those countries, where the ease of the golden age is still in use, women seem least to desire what they most wish for. The men, who were more plain, or rather more free, soon explained their meaning very clearly. They pressed us to choose a woman, and to come on shore with her; and their gestures, which were nothing less than equivocal, denoted in what manner we should form an acquaintance with her. It was very difficult, amidst such a sight, to keep at their work four hundred young French sailors, who had seen no women for six months. In spite of all our precautions, a young girl came on board, and placed herself upon the quarter-deck, near one of the hatchways, which was open, in order to give air to those who were heaving at the capstern [capstan] below it. The girl carelessly dropt a cloth, which covered her, and appeared to the *eyes* of all beholders, such as Venus shewed herself to the Phrygian sheperd, having, indeed, the celestial form of that goddess. Both sailors and soldiers endeavored to come to the hatch-way; and the capstern was never hove with more alacrity than on this occasion."

Bougainville made no pretense that the officers were not equally affected as the sailors: "At last our cares succeeded in keeping these bewitched fellows in order, though it was no less difficult to keep the command of ourselves." The surreal comedy continued when one Frenchman, Bougainville's cook, "having found means to escape against my orders, soon returned more dead than alive"— but not because he had in any way been harmed. No sooner had the disobedient cook "set his feet on the shore, with the fair whom he had chosen," when a "crowd of Indians" undressed him and "tumultuously examined every part of his body." After satisfying their curiosity, the Tahitians "returned to him his clothes, put into his pockets whatever they had taken out of them, and brought the girl to him, desiring him to content those desires which had brought him on shore with her." But the fellow was so undone with fright at his "examination" that he was no longer able to do anything with the girl, indeed so frightened that the islanders "were obliged to bring the poor cook on board."

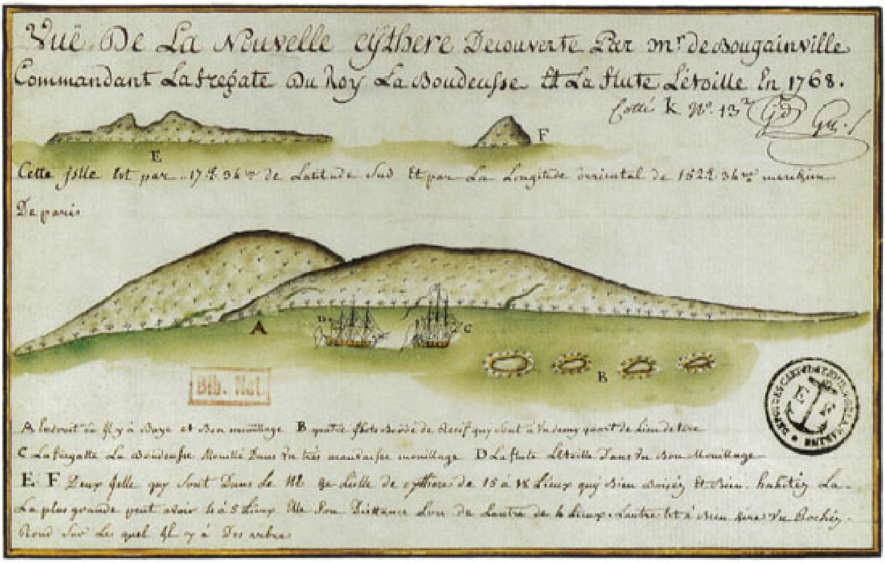

Vuë De La Nouvelle cythere Decouverte Par Mr De Bougainville
Commandant La fregate du Roy La Boudeuse Et La flute L'Etoille En 1768.
Cotté K No. 13
Cette Isle Est par 17 d 36 m de Latitude Sud Et par La Longitude oriental de 152 d 36 m meridien De paris
A
B
C
D
E
F
Bib. Nat.
A Endroit ou il y a Baye et bon mouillage B quatre islots bordé de Recif qui sont a un demy quart de lieue de terre
C La fregatte La Boudeuse Mouillé dans un très mauvaise mouillage D La flute L'Etoille dans un bon mouillage
E F

Fig. 138. *La Nouvelle Cythere,* View of Tahiti, Bougainville, 1768. Bougainville noted that the Tahitians set up fires to alert those in canoes of the locations of sharp reefs. Tahiti's reef is "unequally covered by the sea, and forming little isles in some parts … on which the islanders keep up fires at night on account of their fishery, and for the safety of their navigation." [Bibliotheque Nationale, Paris] *Overleaf.* Fig. 139. James Cooks manuscript of his map of Tahiti, 1769. [British Library, Add MS 7085 f.6]

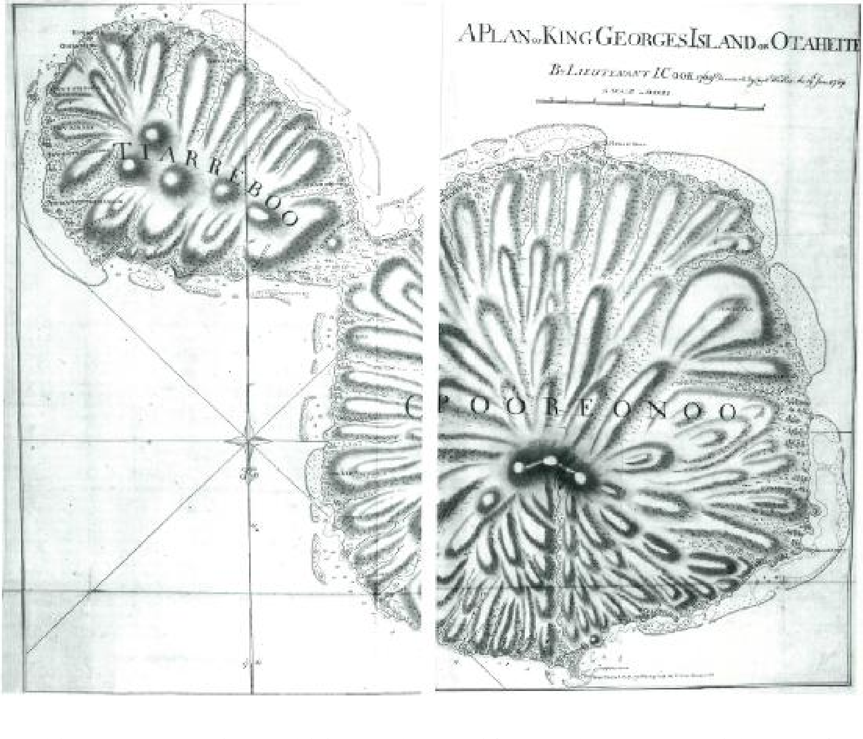
Bougainville first named the land New Cytheria after the island to which Aphrodite was first brought after her birth on the sea, though he also noted that it "is known by the name of Taiti amongst its inhabitants." He met a different crowd of Tahitians than Wallis, his anchorage being about 40 kilometers around the coast to the east, but saw enough evidence of the previous European landing that he knew his was not a discovery.

Surveying the unknown, seemingly idyllic island was, of course, a high priority. Despite this, Bougainville contributed little to the mapping of Tahiti. Of the maps published with the account of his voyage, one included Tahiti, and although wisely only the observed coasts were delineated, even Wallis's cursory data was more comprehensive. "The southern part of it is entirely unknown to us,"

M. Vernon, Bougainville's astronomer, conceded, so their simple map leaves the south open. Winds, islanders, and the loss of their anchor all conspired to keep the island from being better mapped. Nonetheless, Vernon established latitude "in our camp, from several meridian altitudes of the sun, observed on shore with a quadrant," and measured longitude "by eleven observations of the moon, according to the method of the horary angles."

Many other observations had been made on shore during a period of four days and four nights, but Vernon's papers became a casualty of the islanders' adeptness at theft. Those having disappeared, they had to rely only on the readings made the day before their departure. The astronomer "believes their result exact enough, though their extremes differ among themselves 7° or 8°. The loss of our anchors, and all the accidents I have mentioned before, obliged us to leave this place much sooner than we intended, and have made it impossible for us to survey its coasts."

More than Wallis, Bougainville discovered in Tahiti a part of the European psyche—the Noble Savage, that imaginary counterweight to the frenetic competition, material greed, guilt, and hypocrisy of European civilization. That the discovery of Tahiti and similar Polynesian islands coincided with the Age of Enlightenment and the French Revolution is not entirely coincidental; early accounts of these Polynesian civilizations—or the "spin" given these reports by land-bound commentators—helped fuel social movements championing the cause of the common man. At a time when the flaws of Western Civilization were particularly ripe fodder for debate and even rebellion, Man in his primal Innocence had been discovered in Oceania. The Paradise that medieval geographers had placed in some amorphous location on the opposite side of the earth had indeed, so it seemed, been discovered.

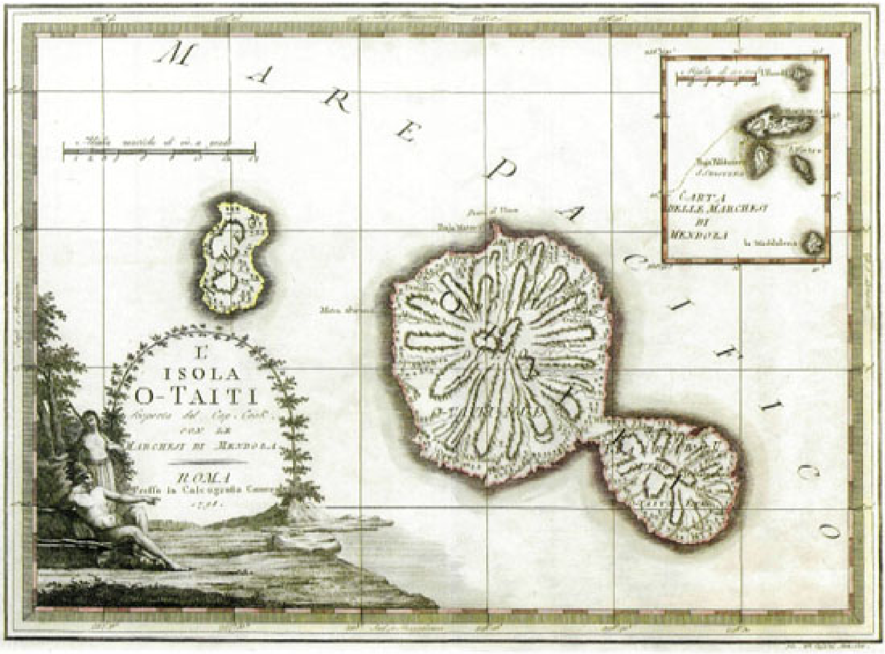


This romance with Tahiti put the Pacific on the "map" with new-found fascination. Never before had Pacific islands been the subject of such quick assimilation into the world view, or the subject of such discussion. Even the Pacific Islanders' reputation for "stealing" became a "positive" attribute, being used to question core tenets of Western values. Once it was understood that the islanders did not have the Western idea of ownership, some European writers then viewed the entire concept of private property with suspicion, an artificial convention which was not necessarily a natural law. Herman Melville later described Tahiti as the place where Christ should have come to the world. Polynesians, he argued during the height of Christian proselytizing, should become missionaries and spread their ways to the "civilized" countries.

Tahiti and the Mapping of the Cosmos

When Wallis reached England on May 20, 1768, a new expedition was being prepared which would leave in a few months under the command of James Cook in the *Endeavour*. Wallis's news of a fruitful island at 150° W longitude was fortuitous, as it supplied the perfect answer to a question then being discussed by Cook and the Admiralty: the best Pacific locale for the new expedition to observe the transit of Venus predicted for June 3, 1769 (see also page 109 above). Thus, Tahiti was set as Cook's first destination.

Fig. 140. Tahiti alter Cook, Cassini, 1798. [Kauai Fine Arts]



Wallis's new-found island was first visible from the *Endeavour* on April 11, three weeks before the Transit was to occur. Two days later, Cook anchored in Matavai Bay and began preparations for the celestial event. As recorded in the *Philosophical Transactions* of 1771, "the astronomical clock … set up in the middle of one end of a large tent" was well-anchored "to prevent its being disturbed by any accident," and its pendulum was adjusted "to exactly the same length as it had been at Greenwich." The observatory had the "journeyman clock" and astronomical quadrant of one foot radius which "stood on the head of a large cask fixed firm in the ground, and well filled with wet heavy sand." A sentinel always stood guard over the tent and observatory "with orders to suffer no one to enter the one or the other, but those whose business it was." Two reflecting telescopes "of two feet focus each, made by the late Mr. James Short" were set up for the event, "one of which was furnished with an object glass micrometer."

On the heralded day of June 3, the weather was kind to the scientists, "as favorable to our purpose as we could wish, not a Cloud was to be seen the whole day and the Air was perfectly clear." Yet something went wrong. When Venus began its transit, "we very distinctly saw an Atmosphere or dusky shade round the body of the Planet," a phenomenon which became known as "black drop." The differences among the observations made at Point Venus, and by two other parties that had observed the transit from neighboring islands, disappointed their hopes of high accuracy.

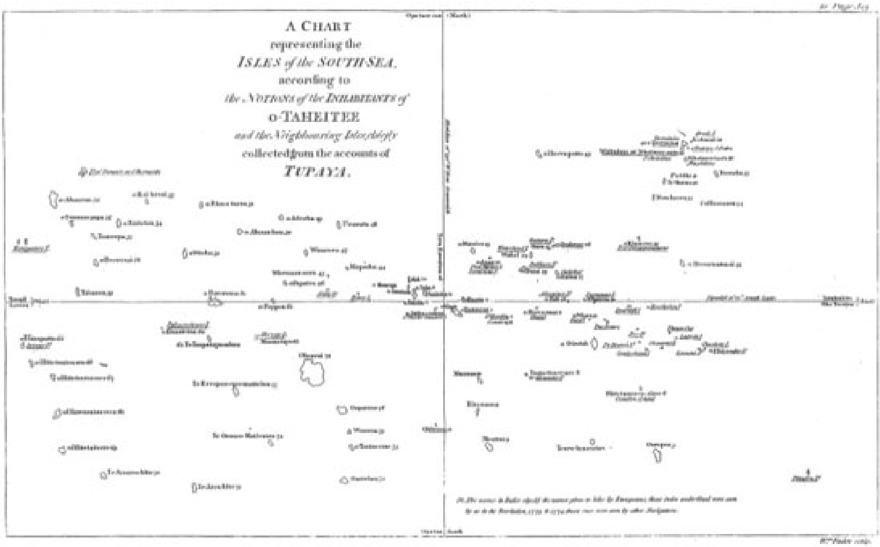

A CHART
representing the
ISLES of the SOUTH-SEA,
according to
the NOTIONS of the INHABITANTS of
O-TAHEITEE
and the Neighbouring Isles, chiefly
collected from the accounts of
TUPAYA.

Fig. 141. Map of the Society Islands and neighboring Polynesia, based on the information of Tupaia, a Tahitian navigator and priest from Raiatea, as received by James Cook on his first Pacific voyage. It is not clear how faithfully this rendering reflects Tupaia's geography, as it was subject to Cook's own interpretation of his information, as well as possible subsequent "corrections," emendations, and copyist liberties. An earlier manuscript version attributed to Cook differs markedly. From Johann Reinhold Forster's *Observations made during a voyage round the world...,* London, 1778. [Library of Congress]

But the geographic mapping of Tahiti itself held no such mysteries (Fig. 139). At three in the morning on June 26, Cook and Banks left Matavai Bay for a clockwise survey of the island, partly by boat, partly by foot. "Captn

Cook and myself set out to the eastward in the pinnace," Banks wrote in his journal, "intending if it was convenient to go round the Island, the weather calm and pleasant. We rowed till 8 and then went ashore in a district called *Ohana"* where he and Cook landed while the boat crew conducted soundings. After weaving their way to Hitiaa, they were shown the site of a previous European anchorage and camp. This was Bougainville's, though Cook, who sailed before the French explorer's return, believed it to be a Spanish ship out of South America.

Cook and Banks continued on foot to Taravao, beyond which passage from Tahiti Nui (western Tahiti) to Tahiti Iti (eastern) proved impossible; the boat helped briefly, then by foot again before Tautira, then back to the boat. A native pilot guided them around the cliffs and reefs of the southeastern point of the island. Much of the south side of Tahiti was traveled by sea, Cook and Banks stopping to record such marvels of Tahitian culture as the imposing *marae* at Mahaiatea, made from coral stone and basalt.

The last day of June brought them to the southwest corner and a slow passage through reefs and shoals, finishing the circuit to Matavai Bay by foot. Six days they had surveyed and explored the reefs and coast, five nights camping away from the security of the *Endeavour* and Matavai Bay. "We had neither of us a change of Cloaths with us," Banks wrote upon returning to the *Endeavour's* anchorage, "so little did either of us expect to go round the Island when we set out from Matavie."

With this first European circumnavigation of Tahiti, they had compiled the raw data to compose the first competent map of the island. The result was a map of the island which "altho it can not be very accurate," Cook explained, "yet it will be found sufficient to point out the Situations of the different Bays and harbours and the figure of the Island and I believe is without any material error." Along with the map of Tahiti, the printed account of the First Voyage contained small maps of Matavai Bay, of their anchorage on the west coast of Huahine, and two bays on Raiatea.

The most obvious weakness in Cook's map of Tahiti is its depiction of Moorea, which has little resemblance to the island's actual shape. Despite its proximity to Tahiti, Cook himself did not visit Moorea until his third voyage. Banks had been there briefly when its tiny offshore island of Motu Irioa was used by his party to observe the transit of Venus; even after Cook visited Moorea on his final voyage and mapped one of its harbors, the original depiction of the island itself remained on most charts for some years.

The Tahitian Navigator, Tupaia

With Banks' encouragement, Cook befriended a navigator and priest from the island of Raiatea by the name of Tupaia. Since Tupaia had "great experience and knowledge in navigation, and was particularly acquainted with the number and situation of the neighbouring islands" (Hawkesworth), Cook attempted to record that geographic knowledge on a European-style map (Fig.

141). Although he states in his journal that Tupaia set his geographic information to paper with his "own hands," the earliest extant version is one drawn by Cook himself in 1769, a manuscript that was obscure until modern times. Tupaia's map became known instead through a rendering, bearing little relation to Cook's surviving manuscript, that was engraved for a book by the naturalist on the second voyage, Johann Reinhold Forster.

Analysis of Tupaia's map is hampered not only by uncertainty over how faithful either the Cook or Banks/Forster version is to what Tupaia intended—whether or not Tupaia actually drew one himself—but also by other questions. Misunderstandings over the directions of islands versus winds may have caused the English to reverse the Tahitian's cardinal directions, or suspicion of such misunderstandings may have caused Cook or later transcribers of the chart to "correct" Tupaia's data. If Tupaia's knowledge of some islands had been garnered through the arrival of waif voyagers, his bearings may have been skewed if the immigrants reached Tahitian shores other than from the direction of their home. Cook's transliterations of place names has left the intended identity of many islands in question, as has Tupaia's use of old Tahitian names.

These questions aside, Tupaia seems, of course, to have been familiar with the Society Islands, and reasonably familiar with the Marquesas to the northeast—not surprising given the evidence of active trade between Tahiti and the Marquesas when the Europeans entered the scene. But if Tupaia was adequately knowledgeable about more distant islands to have been able to sail to them with confidence, the map as it survives does not reflect this.

Forster studied the Society Islanders' navigational techniques and the extent of their geographic knowledge. "They know that the fixed stars do not change their position in regard to one another," he observed, "and have by long experience discovered which stars rise and set at certain seasons of the year; by their help they determine the progressive motion of the planets, and the points of the compass during night. Tupaia was so well skilled in this, that whenever they came with the ship during the navigation of nearly a year, previous to the arrival of the Endeavour at Batavia, he could always point out the direction in which Taheitee was situated."

Tupaia's abilities would not be of value beyond the immediate archipelagos. "It is very well known that their imperfect astronomical knowledge is only applicable to the parts of the world which are near to O-Taheitee, as the appearances would be greatly altered at a moderate distance from their isle." However, his "moderate share of astronomy … did not hinder them from acquiring a very extensive knowledge of the islands in the neighborhood." Tupaia, who Forster described as "the most intelligent man that ever was met with by any European navigator in these isles," had sailed ten or twelve days west of Raiatea, which would have placed him "400 leagues, or about twenty degrees of longitude" away, according to Cook's estimate of daily sailing distance.

Cook took Tupaia aboard the *Endeavour* to help him map the other members of the archipelago, the Tahitian guiding them and citing the name of each island. According to Forster, Tupaia, "when on board the Endeavour, gave an account of his navigations and mentioned the names of more than eighty isles which he knew, together with the size and situation, the greater part of which he had visited, and having soon perceived the meaning and use of charts, he gave directions for making one according to his account, and always pointed to the part of the heavens, where each isle was situated, mentioning at the same time that it was either larger or smaller than Taheitee, and likewise whether it was high or low, whether it was peopled or not, adding now and then some curious accounts relative to some of them." First "Tetiroah" (Tetiaroa) was sighted, then "Huaheine" (Huahine), "Ulietea" (Raiatea, Tupaia's home), "Otahau" (Tahaa) "Bolabola" (Bora Bora), and "Maowrooah" (Maurua). From Raiatea, Cook headed south to where Tupaia claimed more islands would be found, and "Oheteroa" (Rurutu) was sighted on August 13.

Forster acquired his copy of Tupaia's chart from Lieutenant Pickersgill, who had been in Tahiti both with Wallis and then with Cook on the first voyage. He compared it "with another copy of the chart, drawn after Tupaya's direction, in the possession of Joseph Banks, Esq. who, with great politeness and well known readiness to promote whatever has a tendency to become subservient to science, permitted me to take a copy of it."

Forster's reaction to Banks's map suggests that this was a third version. Banks is known to have acquired a copy of Tupaia's map from Cook, yet Forster, comparing the one he had engraved to that which Banks showed him, cites only their similarity: "I remarked that the charts both agreed in general, and that the catalogues contained all the names which were found on the charts, and some few more, not inserted in them. I collected likewise many names and accounts of islands, when we were at Taheitee and the Society Isles. Some of the names were strangely spelt, as there never were two persons, in the last and former voyages, who spelt the same name in the same manner; it must therefore happen, that some of the names seemed to be different; though upon a more critical examination, I found them to agree better than might at first sight have been expected: this chart I have caused to be engraved as a monument to the ingenuity and geographical knowledge of the people in the Society Isles, and of Tupaya in particular…."

The map (Fig. 141) covers about 40 degrees of longitude, centered at about 150° W, and about 20 degrees of latitude, from about 7° S to 27° S. Although during the first Cook voyage, Tupaia's inventory of islands was certainly tapped to locate other islands, by the time Forster's book was published, the map had become just an ethnographic document: "It cannot be expected that this chart should be of such accuracy as to enable future navigators to make use of it: it is chiefly intended to give some idea of the geography of the inhabitants of the isles of the South Sea."

Cook made two visits to Tahiti on his second voyage, the first in August 1773. The astronomer William Wales set up an observatory on Point Venus, where the transit of Venus had been observed on the first voyage. When the expedition returned to Tahiti later in the second voyage, we see Tahiti reversing its role from the island whose position should be ascertained to being the "constant" by which chronometers could be calibrated. The longitude of Point Venus had been established with precision; its observatory now served as the first mid-Pacific point by which instruments could be set in order to map other shores accurately.

Cook concluded his second voyage's account of the Society Islands with "some observations on the watch which Mr. Wales hath communicated to me. At our arrival in Matavai Bay in Otaheite, the longitude pointed out by the watch was 2° 8' 38*ill* " too far to the West; that is, it had gained, since our leaving Queen Charlotte's Sound … it was judged that half of this error arose after we left Easter Island; by which it appeared that it went better in the cold than in the hot climates."

An observatory was again set up at Point Venus when Cook returned to Tahiti on his third voyage in August 1777. Cook's principal contributions in Tahiti this visit were ethnographical, providing a fine account of various aspects of island culture. His description of a human sacrifice helped put European romanticization of the island into better perspective.

Surprisingly, the neighboring island of Moorea, though only about 17 kilometers from Tahiti, had never been visited by Cook, and the inept delineation given the island on the otherwise fine map of Tahiti Cook composed in 1769 (Fig. 139) suggests that no serious effort had been made to chart it. Thus Moorea now became his first stop when, after one and a half months, he left Papeete and began one final sweep to the west before undertaking his assignment in the Northwest Coast.

Cook sailed west past the bay now named for him but which he never visited (Cook's "Parowroah"), instead choosing Opunohu Bay (Cook's "Taloo") for his anchorage (Fig. 143). Although *Parowroah* is the larger harbor, Cook explained that its "entrance, or opening in the reef (for the whole island is surrounded by a reef of coral rock) is considerably narrower, and lies to leeward of the harbor. These two defects are so striking, that the harbor of Taloo must always have a decided preference."

The people of Moorea were at first leery of the English, suspecting that they had aided the Tahitians in an attack against their island, but nonetheless courteous and obliging. After Cook liberally provisioned the ship and attempted to coax its rat infestation ashore, a dispute over a goat led to tragedy. Cook retaliated for the perceived offense by reaping widespread havoc to the island, his vengeance both terrifying and indiscriminate. Nor, if the printed account fairly reflects his sentiments, did he ever see the madness of his actions even when other officers did; he refers to the incident as "unfortunate" while insisting that "it was their own fault." This was the tiring

Cook, not the level-headed commander.

Later Explorers and Missionaries Map Tahiti

A new map of Tahiti was compiled in May 1797 by the first English missionary voyage to the island, that of James Wilson in the vessel *Duff* (Fig. 144). The map brought together the original map of Cook, refinements to that chart made by Cook on his subsequent voyages, and the observations of Wilson, resulting in various improvements, notably the shape of the eastern portion of the island.

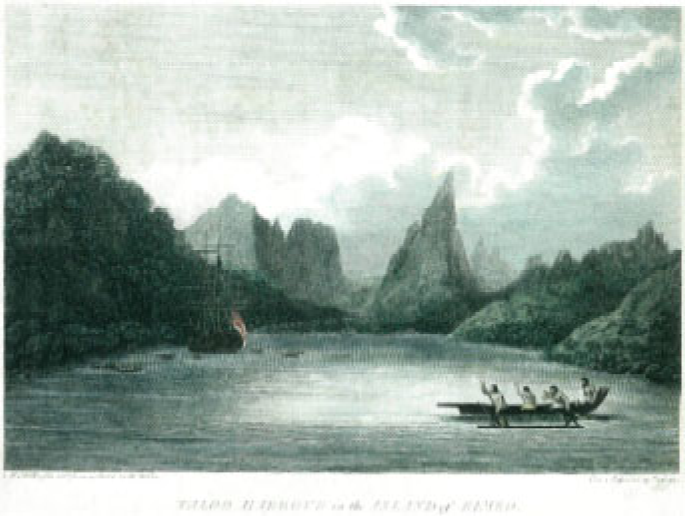

TALOO HARBOUR in the ISLAND of EIMEO.

Fig. 142. View of Opunohu Bay, Moorea, James Wilson, 1799. The name "Taloo" came from the bay's Tareu Rock.

The Wilson map records a small body of water just southeast of the mountainous center of the western half (Fig. 145). Marked "Curious Lake" on the map, this is Vaihiria, Tahiti's only real lake, fed by the rain and rivers from Papenoo crater above. The UnitedStates Exploring Expedition, which reached Tahiti in September 1839, investigated the lake and placed it at 2000 feet above sea level—a bit above its true height of 473 meters. When Captain Henry Martin visited Vaihiria in 1847, reaching it in "four hours hard walking from Papeuriri," he was skeptical about the subterranean outlet that was supposed to exist to account for the changes in the lake's water level. "The marks on the shore show that when the water is 20 feet higher it remains long enough to give ample time for evaporation. The eels in this lake are said to be immense and dangerous to swimmers. Its calm placid surface reflecting every object of the wild savage scenery around had a remarkable & an agreeable effect." The lake's eels gave rise to one of Tahiti's best-known legends, Princess Hina.

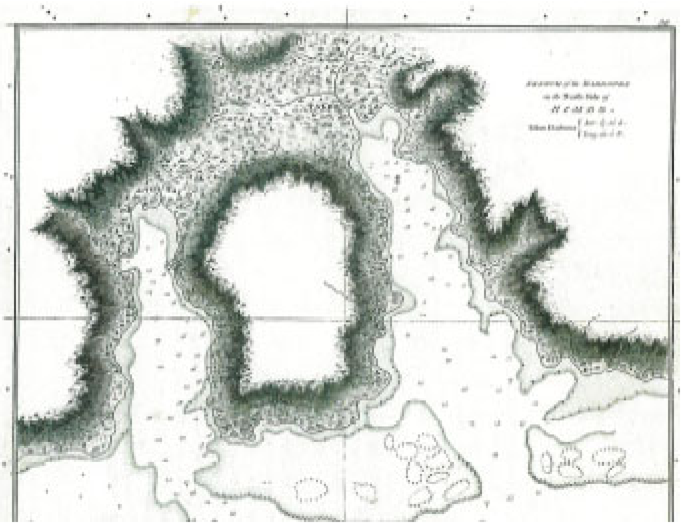


Fig. 143. Opunohu Bay, Moorea, James Cook, 1784. Although Banks visited Moorea on the first voyage, Cook himself, despite the island's proximity to Tahiti, did not go there until the third voyage.

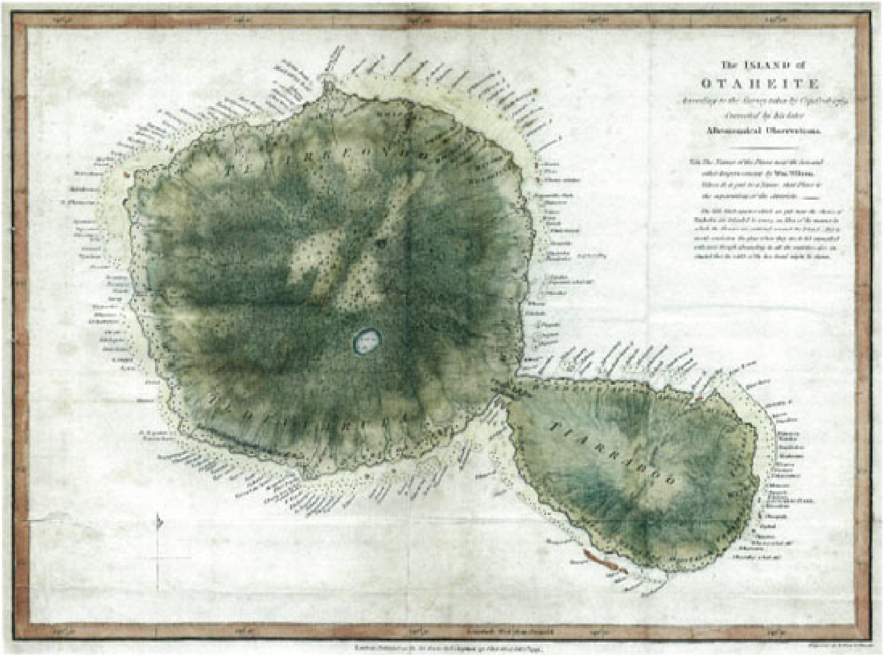

The ISLAND of
OTAHEITE
Astronomical Observations.
TIARRABOO

Fig. 144. Tahiti, James Wilson, 1799.

Tahiti's shores quickly became the most cosmopolitan in the south Pacific. Most exploring expeditions refreshed there, Freycinet's being the notable exception, though only contrary winds kept him away. Whalers made themselves at home there, many opting to settle, Western governments fought for influence and privilege there, and missionaries vied for its people's souls.

When Otto von Kotzebue reached Tahiti in March 1824 on his second voyage, he found a different world than what Wallis, Bougainville, and Cook had seen a half century early. None of the splendid canoes were to be seen. Dancing and the nose flute, icons of Tahitian civilization, were strictly outlawed. Even the objects of barter had succumbed to the missionary's laws: Kotzebue's crew conducted a brisk business in a most unlikely commodity, selling their old clothes to theTahitians at phenomenal prices.

After ten days in Tahiti, Kotzebue "steered past the Society Islands, lying to leeward from Tahiti, in order to rectify their longitude." He fixed the western point of Raiatea at 151° 26' 30", "which is nearly the same as on the maps," and was within about *y* of actual. He found the Society Island longitudes laid down by his predecessors to be reasonably accurate, with the exception of Maupiti (his *Maurura),* which "is very inaccurately laid down; we found the longitude of the middle of the island, as we sailed past its southern coast, to be 152° 10' 40"." This figure, which is about 81/2 kilometers too far east, is not so different from Cook's map, in which the island's western coast skims the 152° mark.

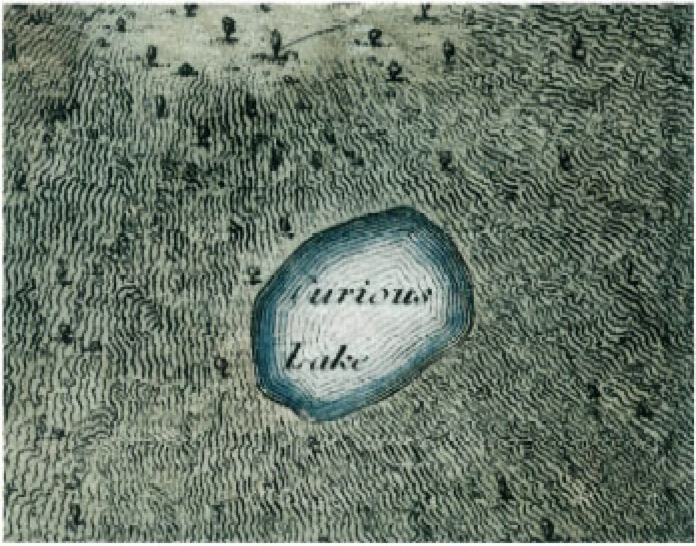


Fig. 145. Vaihiria Lake, detail from the map of Tahiti by James Wilson, 1799.

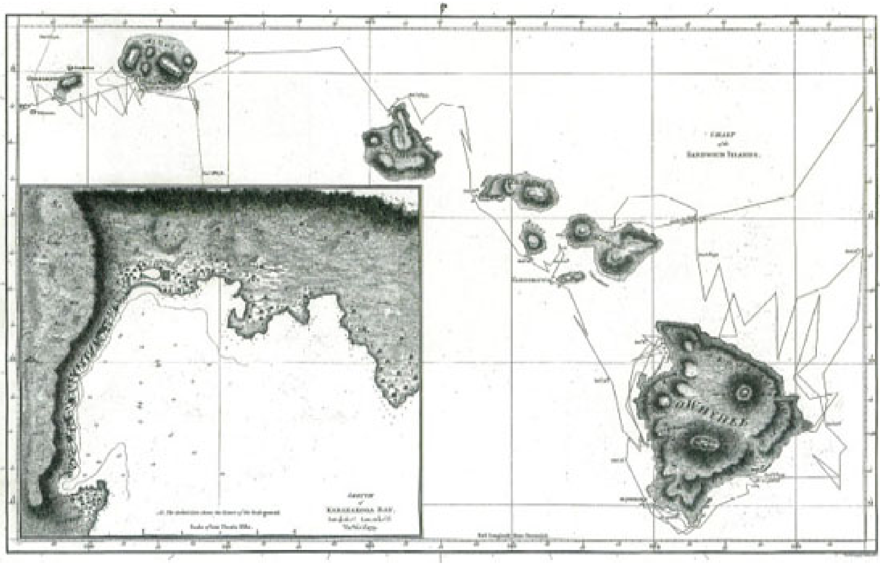


Fig. 146. The first map of the Hawaiian Islands, from the published account of Cook's third voyage, 1784. [Lahaina Printsellers, Ltd] *Overleaf.* Fig. 147. Northern Pacific, Pierre du Val, 1679 (1684). One sheet of a four-sheet world map. [Martayan Lan, NY]

The European Discovery of Hawaii

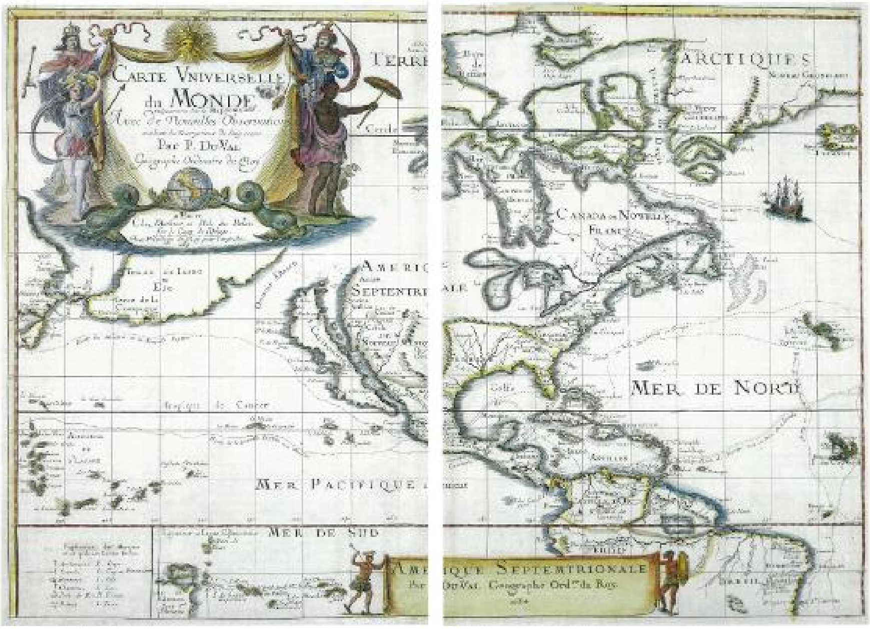
"Before I sailed from the Society Islands," James Cook says of his final departure from the islands in early December 1777, "I lost no opportunity of inquiring of the inhabitants, if there were any islands in a North or North West direction from them." They seemed not to know of any However, a low atoll was discovered on the 24th of December, which provided a bounty of turtles for food and solid ground to set up three telescopes to observe an eclipse of the sun which would occur on the 30th. They named the island after Christmas. Cook did not consider a minor discovery such as this to be remarkable or unexpected.

Continuing north, they began to see birds and turtles, and probably prepared to record another minor isle. But when on the morning of January 18, 1778, land was seen to the northeast which was not on their charts, it was formidable and populated—Oahu, this the recorded European discovery of Hawaii. Soon Kauai was seen to the north. The following morning Oahu stood nearby to the east, but winds prevented their approach, so they sailed for Kauai, thus soon sighting Niihau as well. When, upon reaching the coast of Kauai, canoes approached with three to six men in each, "we were agreeably surprised to find, that they spoke the language of Otaheite." The next morning, the 20th, a suitable landing was found. Of the Hawaiians that crowded aboard the ship, Cook remarked that he had "never before met with the natives of any place so much astonished … their *eyes* were continually flying from object to object; the wildness of their looks and gestures fully expressing their entire ignorance about every thing they saw."

Despite the importance of the discovery, their priority had to be to reach northern waters at the right time of year, and so this initial encounter with Hawaii was brief. However, when the summer came to a close, wintering in Kamchatka would have meant a half year of fruitless waiting, so after their successful northern mapping endeavors and unsuccessful attempt to find a Northwest Passage, they sailed back to their new-found islands. The last words Cook authored in the official account of the voyage were written nearing Hawaii for the second time: "I had no where, in the course of my voyages, seen so numerous a body of people assembled at one place. For, besides those who had come off to us in canoes, all the shore of the bay was covered with spectators, and many hundreds were swimming round the ships like shoals offish."

To their having failed to find a Northwest Passage, "we owed our having it in our power to revisit the *Sandwich Islands,* and to enrich our voyage with a discovery which, though the last, seemed, in many respects, to be the most important that had hitherto been made by Europeans, throughout the extent of the Pacific Ocean."

Cook had no illusion that their initial visit had been sufficient for even a cursory map, yet when Maui came into view he realized that the archipelago was larger than thought. "We were now satisfied, that the group of the Sandwich Islands had been only imperfectly discovered; as those of them which we had visited in our progress Northward, all lie to the leeward of our present station."


Carte Vniverselle du Monde
Avec de Nouvelles Observations
Par P. Du Val
Geographe Ordinaire du Roy
Terre
Arctiques
Canada ou Nouvelle France
Americ
Septentrionale
Tropique de Cancer
Mer Pacifique
Mer de Sud
Mer de Nort
Ameriqve Septemtrionale
Par P. Du Val. Geographe Ord. du Roy

On December 4, they were on the northern coast of Hawaii, east of the

Kohala Mountains at the base of the island's northern peninsula. An eclipse of the moon was observed from the coast by James King with a night-telescope, "a circular aperture being placed at the object end, about one-third the size of the common aperture," and observed by Cook "with the telescope of one of Ramsden's sextants," a reference to the innovations of the instrument maker Jesse Ramsden.

The mean of the two results was 204° 35' E. But immediately after the eclipse finished, both Cook and King "observed the distance of each limb of the moon from *the pollux* and *Arietis;* the one being to the East, and the other to the West." "Pollux" is a star near Castor, in Gemini, and "Arietis" was the name used by eighteenth-century European sailors for the star now commonly known as Hamal. These additional observations yielded a final reading of 204° 04′ 45 " E, a figure which is too far to the east and which was later amended, as it was not followed in the published map.

Despite the enthusiasm and generosity of the Hawaiians toward the English visitors, feeding and reprovisioning them strained available resources, and most Hawaiians undoubtedly were relieved when they set off. But damage to the *Resolutions* foremast forced Cook and his crew back to Kealakekua Bay a week later, a visit culminating with Cook's death.

Although some independent accounts of the voyage reached the market quickly in response to public fascination with the expedition, none contained the map of Hawaii. The Hawaiian Islands were nonetheless placed on some general maps within the first couple of years after the expedition's return. In 1781, three years before the publication of the official account with the Hawaii map, a single-volume account of the voyage became popular reading in England, which though published anonymously is generally attributed to Lieutenant John Rickman. The book contains a general Pacific map which compresses the latitudinal and longitudinal breadth of the Hawaiian Islands, so that Hawaii itself appears a few degrees too far north, and all the islands are to varying degrees too far west. However, the volume's editor assured readers that the map "illustrates the course with as much accuracy as is necessary even for Geographers."

The Admiralty appears to have kept its material adequately safeguarded, and indeed the original survey of the islands from which the printed map was made is not extant. Since the principal Hawaiian Islands are compact and few in number, one leading to easy sight of another, Cook and crew were able to make a comprehensive mapping of the newly discovered archipelago. In contrast, such groups as Fiji or Tonga required the surveys of several explorers just to inventory their major islands. The map's principal flaws are its omission of the southern coast of Oahu, where Honolulu and Pearl Harbor lay, and the northern coast of Kauai.

Do Maps Record Hawaii before Cook?

Was Cook truly the European discoverer of Hawaii, despite the north Pacific waters having been plied by European vessels for two and a half centuries before him? Theories have long circulated that any of several islands commonly seen on maps from the sixteenth and seventeenth centuries might be Hawaii. Islands discovered by Juan Gaytan, who sailed with Villalobos from Mexico to the Philippines in 1542, are the earliest; an archipelago attributed to Gaytan, named *Is las de la Mesa,* has engendered particular attention and is found, for example, on Spanish charts won by Anson during his circumnavigation (Fig. 111). Anson's map also places an *IsLz de Sn. Francisco* at about the latitude of the island of Hawaii, and in roughly the correct longitude.

A more intriguing suggestion of early Spanish knowledge of Hawaii is found in a map by Pierre du Val (Fig. 147), published exactly a century before Cook's discovery of the islands. *les Moines, la Vezina,* and *la Disgraciee* lie in "precisely" the correct latitude, just south of the Tropic of Cancer, needing but a bit of imagination to "look" like Hawaii. Although they lie too far east, their longitude is little worse than that assigned some "known" islands at the time. Interestingly, Spanish galleys are marked brushing them to the south en route to the Philippines. Perhaps most remarkable is the "inhabited island" on the 1754 map by the theorist Philippe Buache (back endpaper), which lies in virtually the exact position of Hawaii, about 40° W of Baja California and 19° N latitude.

La Pérouse suspected that Hawaii was not Cook's discovery. Knowing in advance the ulterior motives a French explorer might have for proposing this, La Perouse assured his readers that "those who know my character cannot suspect, that I have been influenced in this research by the desire of taking away from captain Cook the honour of this discovery," and waxes of him as the greatest of navigators. When, in 1786, La Perouse sailed north from Easter Island for Hawaii, he deliberately reached Hawaii's latitude far to the east so that he could search for the islands commonly found in those waters on Spanish charts, particularly *La Mesa, Los Majos,* and *La Disgraciada.* Failing to find any, when on May 28, 1786 the peaks of Hawaii appeared to the west, he became convinced that *La Mesa* was one of the Hawaiian chain. Thus, he attributes the discovery of Hawaii to Gaytan in 1542, also citing the group that Gaytan dubbed *Kings Islands,* and the particular member *Garden Island.* Since the Spanish had plotted them before longitude could be accurately laid down, the reasoning went, and since no other islands occupy those latitudes in this part of the ocean, the Spanish discoveries must have been members of the Hawaiian group. "Upon the chart that admiral Anson took on board the Spanish galleon," he wrote, "and which the editor of his voyage has caused to be engraved [Fig. 111], this cluster is placed precisely in the same latitude as the Sandwich Islands, and at 16 or 17° more to the eastward. My daily differences of longitude made me think, that these islands were the same."

"But what completely convinced me," La Perouse goes on to explain with faulty logic, "was the name of *Mesa,* which signifies *table,* given by the

Spanish to the island of Owhwhee." Why was this term so compelling? When Captain King (who took command of the third Cook expedition after the latter's death) "doubled the eastern point" of Hawaii, "they discovered a mountain called *Mowna-roa"* (Mauna Loa), whose plateau top King referred to as *Table-land."* La Perouse cites the Hawaiians' "commercial habits," and their knowledge of iron, "which from their own concession they did not acquire from the English," as further proof "of the frequent communication which these people have formerly had with the Spaniards." Cook did, in fact, remark that the Hawaiian already had some pieces of metal when he first reached the islands, though this could have been the result of trade among islanders.

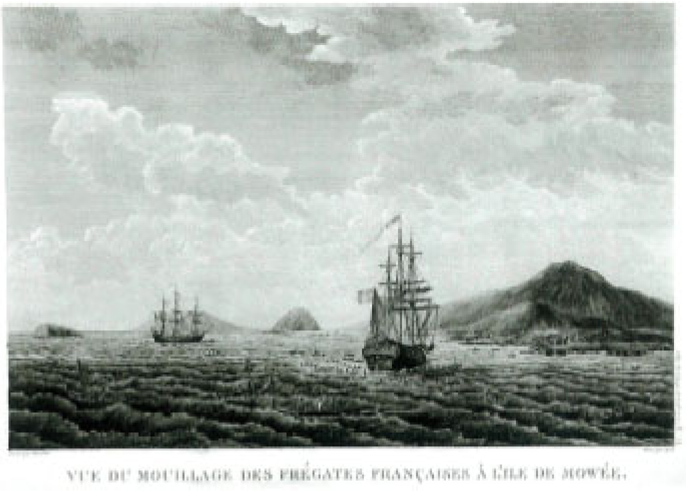

VUE DU MOUILLAGE DES FRÉGATES FRANÇAISES À L'ILE DE MOWÉE.

Fig. 148. Southern Maui as seen by La Perouse and crew in 1786. From La Perouse's Atlas 1797.

While early Spanish contact with Hawaii in the form of isolated encounter or shipwreck is certainly possible, it is unlikely that it is reflected in any map. Any encounter with the Hawaiian chain would have constituted not just a major discovery in itself but in addition a bountiful mid-Pacific stopping point, lying as it does about halfway between Mexico and the Philippines. That Spanish mariners could have reached this idyllic archipelago and not laid claim to it, exploited it for its unique strategic value in their trans-Pacific commerce, nor attempted colonization, strains credulity.

Then why do islands such as those cited by La Perouse lie in the location of Hawaii on many early maps? The wild variation in charted longitude, and even inaccuracy in latitude, placed islands in all parts of the Pacific at the hands of various mapmakers, and indeed it would have been far more surprising if some islands did *not* find their way to the approximate position of Hawaii. Islands can be found, on different maps and at different times, in virtually all regions of the Pacific.

The Spanish, according to La Perouse, kept the islands from being known because of the benefit they would offer pirates, the Spanish themselves eventually losing memory of them. He found the identity of the old Spanish islands with Hawaii "to be so clearly demonstrated, that I thought it my duty to clear them away from the surface of the sea," that is, to remove what he believed to be the duplication of Cook's Hawaii and the old Spanish "Hawaii": "Thinking it an important service to geography if I could succeed in taking away" the non-existent islands on Spanish charts, errors which "are very prejudicial to navigation," La Perouse "even formed the design of passing between the island of Owhyhee and that of Mowee, which the English had not been able to explore; and I proposed to land at Mowee, to traffic there with the inhabitants for some supplies of fresh stock, and leave it without loss of time."

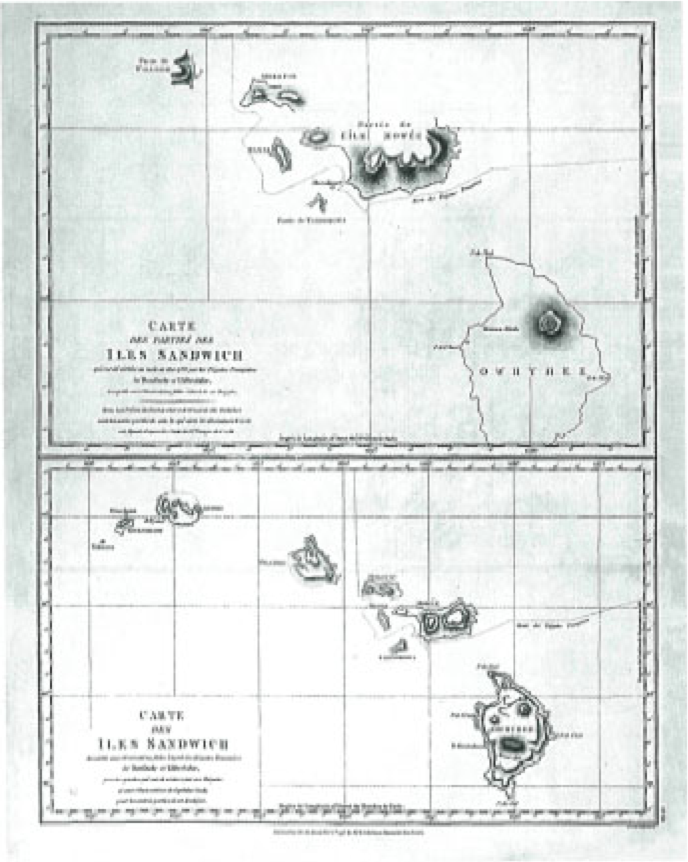
Passing the "big island" of Hawaii, La Perouse's fleet anchored near the bay on southern Maui now named for him, where a draw ing was made of the coast (Fig. 148). Merely two days were allotted for his hydrographers, Dagilet and Bernizet, to survey the islands, their urgency being the same that kept Cook's initial visit brief— season-sensitive plans in the Northwest Coast of America. As a result, La Perouse failed to fill in the southern Oahu and northern Kauai coasts which Cook had missed, and his mapping of the island chain did little to add to that of Cook. The "Indians" of Maui were exceedingly polite, La Perouse commenting that he "had no idea of a people at once so mild and respectful." So impressed was he with the Hawaiians that he made a point of placing blame for Cook's death on the imprudence of his men who fired without adequate provocation.

La Pérouse's east-west breadth of the island of Hawaii is truncated as compared with the more accurate Cook map. He did add some detail to the portion of the southern Maui coast where he stopped, but overall, even that island is a step backward from Cook's chart. Nothing better could be expected with such a brief stay, and since the commander did not live to assist in the preparation of the published materials, we do not know in what context he would have presented his survey of the islands.

After the expedition's work along the Northwest Coast, en route to Macao they discovered Necker, thus beginning the mapping of the Hawaiian chain's older, smaller members extending to the northwest of the main, inhabited islands.

The account of La Perouse's voyage, complete with charts, was first published in Paris in 1797. Demand for the lost navigator's story led to the volumes being translated into English and republished in London the following year (1798). The maps were completely re-engraved for this English edition on a slightly smaller format. These same reduced English plates were then reworked to serve for a French edition published in London in 1799 (Fig. 149), the English being rubbed from the plate and re-engraved in French. The nomenclature, and the publishing imprint from the 1798 issue, remained untouched.

Fig. 149. Prepared for the printed account of La Perouse's voyage, the upper map shows Hawaii as surveyed by the French expedition, and the lower map combines that data with the map from Cook's voyage. This example is from a French edition published in London in 1799 from the same copperplate used for an English edition of the previous year.


CARTE
DES PARTIES DES
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OWHYHEE
CARTE
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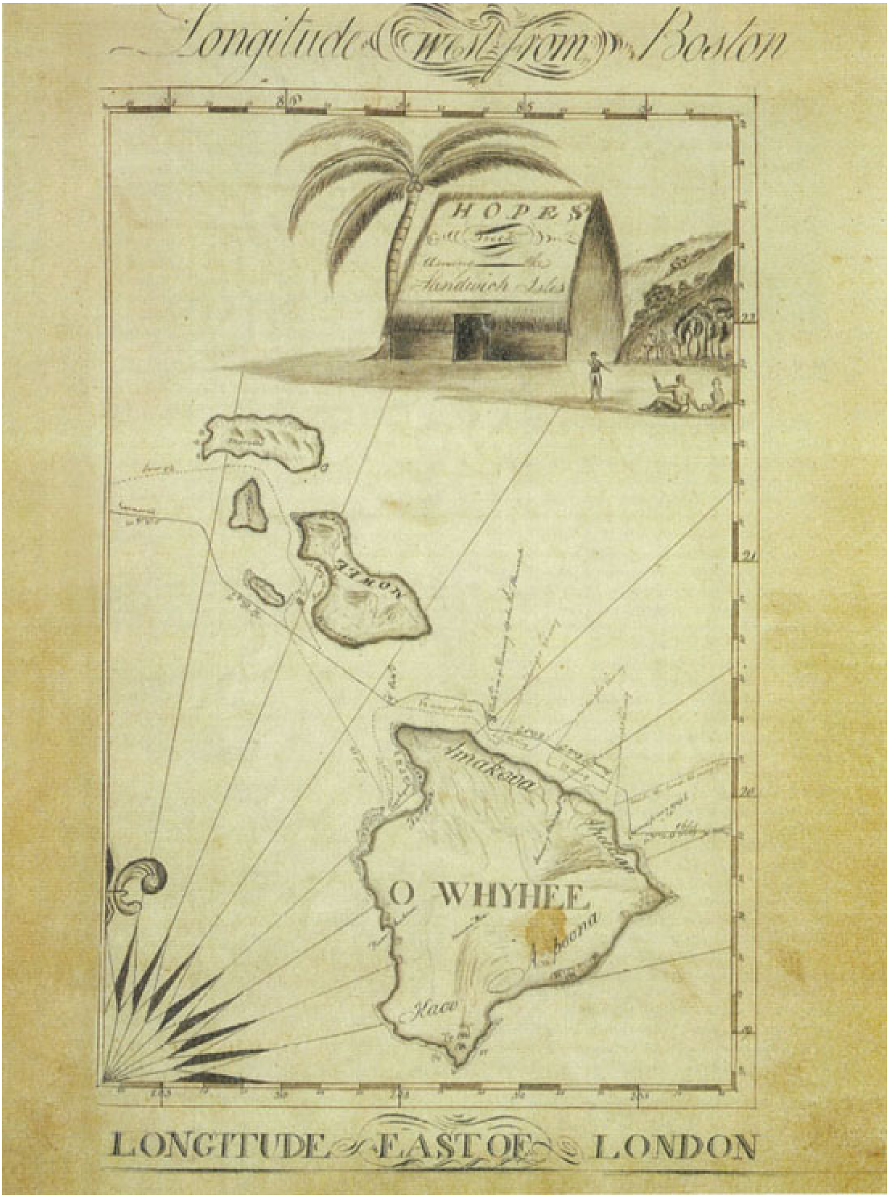
ILES SANDWICH


Longitude West from Boston
HOPES Track Among the Sandwich Isles
MOWEE
Amakooa
O WHYHEE
Kaoo
LONGITUDE EAST OF LONDON

While La Pérouse failed to remedy Cook's omission of the southern Oahu coast, a fleet which arrived in the islands just before him did. In late May 1786, and then again in the winter of 1786-7, the second English fleet to reach Hawaii, the *King George* and *Queen Charlotte* under George Dixon and Nathaniel Portlock, christened the islands' use as a way-station for purely commercial voyages to the furs of the American Northwest. Both Dixon and Portlock had been with Cook on the third voyage, and Portlock would return to the Pacific with another veteran of that voyage, William Bligh, when Bligh repeated the breadfruit voyage which had been foiled by the *Bounty* mutiny on the first attempt.

The account of Dixon's and Portlock's adventures was published in early 1789, and included a record of the previously unknown southern coast of Oahu. The volume, however, contained no comprehensive map of its shores. Only a plan of Maunalua Bay, between Honolulu and the island's eastern coast, and a plan of a bay on Niihau, were included, these having been engraved in late 1788. The account's view of Maunalua Bay, engraved in 1789, was the first published image of southern Oahu.

The first American map of Hawaii was that of Joseph Ingraham (Fig. 150), sailing in the Brigantine *Hope*. Ingraham's stop in Hawaii was a purely practical one, to take on wood, water, and food en route from the Marquesas to the Northwest Coast of America. Better to "lose a little time at the Sandwich Isles than risk losing my men by the scurvy," he wrote. He had already been to Hawaii while employed on the *Columbia* on John Kendrick's enterprise.

Ingraham reached Hilo in 1791, where he traded "bits of iron hoops and nails" for pigs, fowl, taro, plantains, coconuts, and sugar cane, "beside many hundreds of fathoms of fine line of various sizes." Continuing along the north coast of Hawaii, the clouds cleared and Mauna Kea came into view. Ingraham recalled James King's (third Cook voyage) estimate that the snow-covered mountain was higher than the peak of Tenerife (which it is).

Like Cook and most navigators bound for the Northwest Coast, Ingraham visited Hawaii twice, en route to and from the northern waters. His map of Hawaii was of no influence: it had little to offer over existing charts, in overall accuracy fell short, and was not published in his lifetime. But his reports about the islands, and his presence there, were significant, and he was among the earlier Westerners to report and map the southern coast of Oahu, as well as Kauai and Niihau. On both visits, he was caught in the complex and violent intrigues that were embroiling the islands at that time. While trading amicably offshore Waikiki ("Waitietie"), "a single canoe from windward arrived and put a sudden stop to our friendship. The word *ko'a*—war—was passed from one to another, and they immediately left us, some not even waiting to receive pay for what they had sold."

Opposite:. Fig. 150. Hawaiian Islands from Joseph *Ingraham, Journal of the Brigantine Hope,* 1791. [Library of Congress] *Below Vig.* 151. The original Russian edition of Krusenstern's map of the Hawaiian Islands, 1827. Honolulu is mapped in an inset taken from Kotzebue's plan. [Lahaina Printsellers, Ltd]

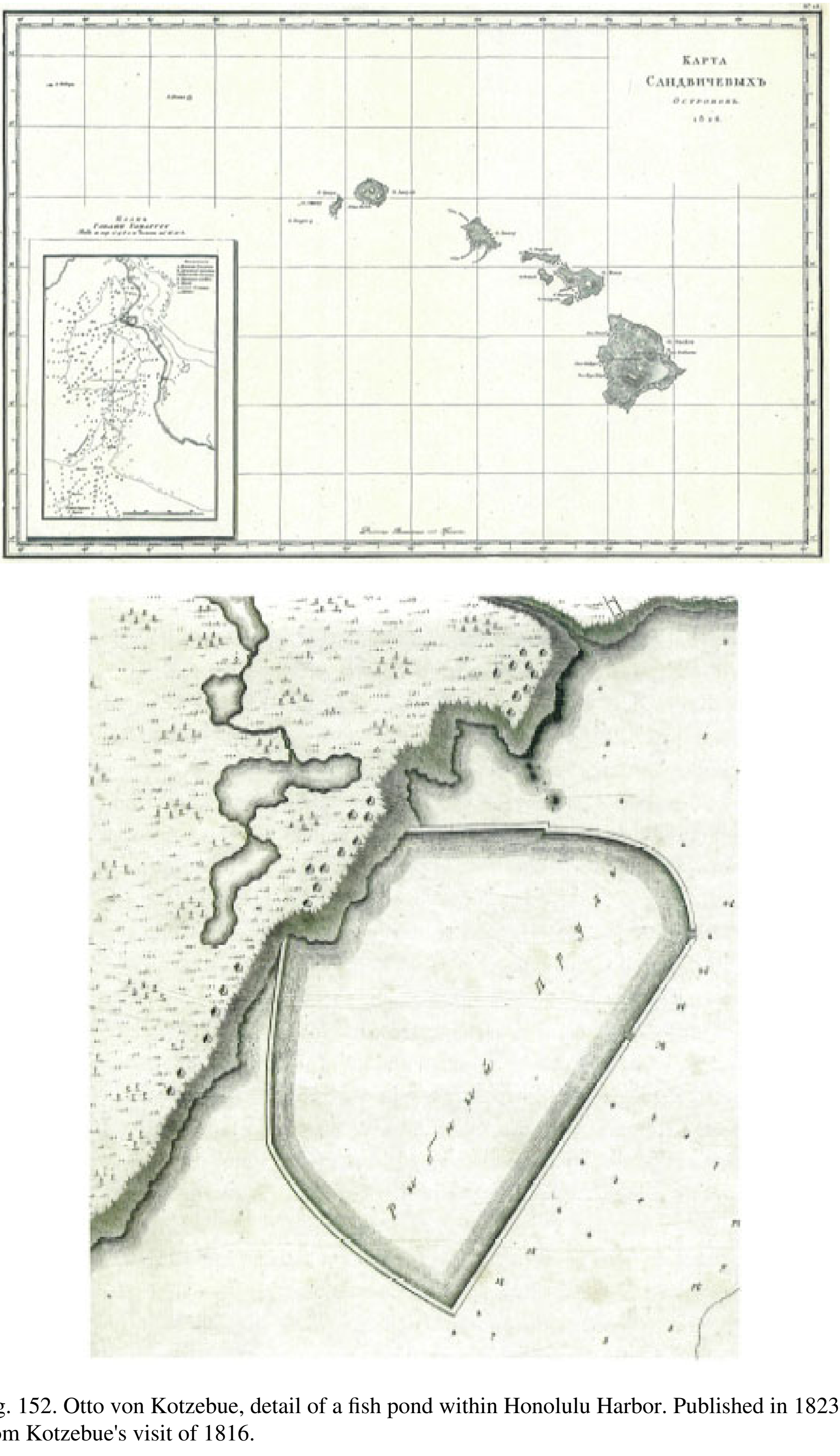

Карта
Сандвичевыхъ
Острововъ
1816

Fig. 152. Otto von Kotzebue, detail of a fish pond within Honolulu Harbor. Published in 1823 from Kotzebue's visit of 1816.

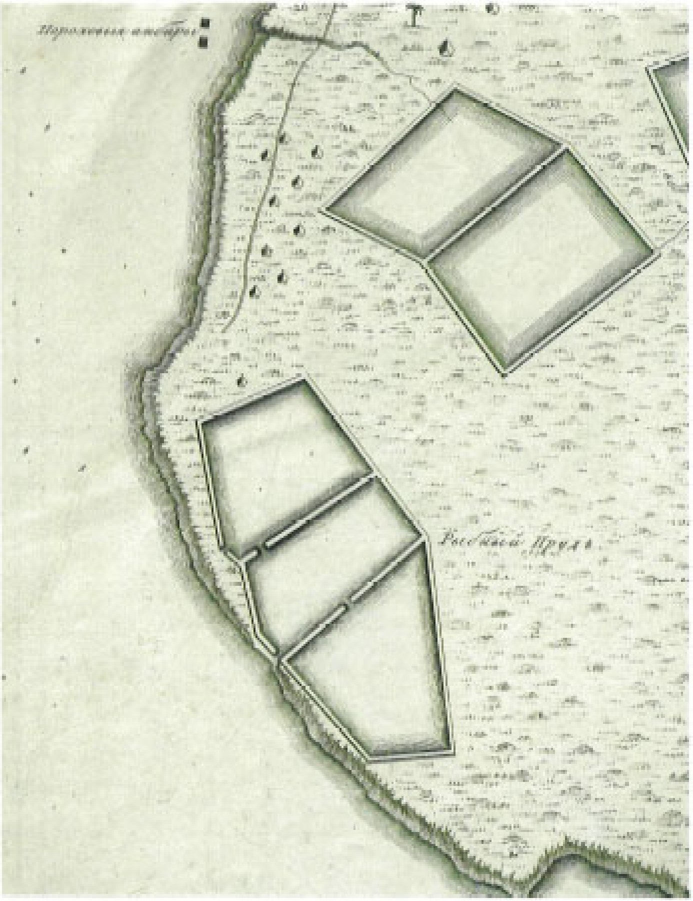


Fig. 153. Otto von Kotzebue, detail of inland fish ponds from his chart of Honolulu Harbor. The two small black rectangles on the upper left is a powder magazine. Published in 1823 from Kotzebue's visit of 1816.

The cause of the mapping of Hawaii had its greatest early advocate in the person of George Vancouver. The map of the islands that accompanied the printed account of Vancouver's voyage remained a core survey of the islands well into the nineteenth century. Vancouver had sailed with Cook on both the second and third voyages, and had been slightly injured in an attack in Hawaii on the discovering expedition. On his own expedition of 1791—5, Vancouver made fully three trips to Hawaii. He was the first to circumnavigate every major island, and thus unlike his predecessors he was able to delineate the full coastlines of all the islands.

Overall, the published chart, said in the title to have been compiled by Lieutenant Joseph Baker, is a marked improvement over the maiden Cook chart. However, longitude shows mixed results: Kahuku Point, the northernmost point on Oahu, is extremely accurate on the Vancouver map while placed a quarter degree too far east by Cook; Vancouver places Hana, on the far east of Maui, slightly to the west, whereas Cook had again placed it too far east; and Kealakekua Bay, on Hawaii, is placed identically on both maps, though curiously a more accurate figure is cited in Vancouver's journal.

Urey Lisiansky, second in command on Krusenstern's fleet of two vessels that sailed to the American Northwest for the fur trade, separated from his superior's vessel at Hawaii in May 1804 (Fig. 151). During this planned diversion, Lisiansky called at Kealakekua Bay (Hawaii) and Waimea Bay (Kauai), obtaining supplies on the first and meeting local dignitaries on the second. Sailing from America to Canton, he was nearly wrecked on the northern outlying Hawaiian isle that still bears his name. Of this island which, in his words, "promises nothing to the adventurous voyager but certain danger," he took thirty-four measurements and ascertained a longitude of 173° 42' 30" W, within about 15' of true. Despite his map, other vessels were wrecked there, and it was briefly called Pell when mistaken for an unknown island.

Meticulous large-scale charting began with the arrival of Otto von Kotzebue in Hawaii in November-December 1816, and September-October 1817. Explanations by his colleague Dr Hörner show that the chronometer had not entirely supplanted others methods of fixing longitude: "The determination of the longitude is made partly by chronometers, and partly by lunar distances; with respect to the first, it is well known that the best instruments of this kind, when they are exposed to a considerable and continued change of temperature, gradually alter the rate of going, and it seems too as if the effects of the cold or heat upon the watches do not become observable, till after some days have elapsed" … due to the thickening or thinning "of the very small portion of oil which these instruments still require, even when the friction is diminished by means of diamonds." Lunar distances "are still the best means of determining the longitude; however they must be observed in considerable numbers, and, if possible, with instruments that magnify powerfully."

Kotzebue speculated that England would soon claim the islands, indeed "perhaps already, in silence, considers them as her property." While this reasonable prediction would prove wrong, few could have imagined that Oahu's southern coast, which had been poorly mapped by its earliest European visitors, would become the epicenter of the Hawaiian Islands. Yet Kotzebue already found Honolulu looking like a European harbor, where Chinese porcelains had replaced native eating vessels.

Kotzebue kept a tight ship: "We had scarcely cast anchor when a great number of Hawaiian women surrounded the *Rurick."* When he refused their access to the ship, "the amicable nymphs sang to us some love-songs, and turned back much astonished at our cruelty."

Early on November 27, 1816, Kotzebue "took the course to the west point of Wahititi Bay [Waikiki], which is not to be mistaken, on account of the conical mountain there." In a footnote, he explains that the English call this mountain Diamond Hill (Diamond Head), an appellation derived from the crystals found there; or, as Byron observed when there in 1825, "so called because some crystals found there had been mistaken by ignorant European sailors for diamonds," which had resulted in a taboo being placed on the area for a time.

Whereas today Kauai is known as the "Garden Isle," the term was earlier associated with Oahu (today referred to as "the gathering place"). Kotzebue found that "Oahu *(Woahoo*) is acknowledged, both by Europeans and by the natives, to be the most fruitful of the whole group; it is called the garden of the Sandwich islands, and it has a right to that name, on account of its extraordinary high state of cultivation, united with the greatest natural beauties."

Vancouver's fondness for Waikiki, Kotzebue wrote, had caused him to miss the superior harbor of Honolulu. "We sailed past the village of Wahititi [Waikiki], near which Vancouver cast an anchor in a very dangerous situation, not knowing that he was in the vicinity of a most commodious harbour, and saw through our telescopes the village of Hana-rura [Honolulu], close to which is the harbour of the same name." Honolulu harbor, before the extensive dredging and filling that made it into the harbor we know today, was accessed only by a narrow opening through the coral reef created by the outflow of Nuuanu Stream—an opening which did not allude to the fine harbor within.

Although Vancouver missed the delights veiled by the unassuming entrance, two vessels, the*Jackal* and *Prince Lee Boo,* entered it in late 1793, and three years later William Broughton in the *Providence* is believed to have surveyed it; but his charts, if they were made, are not extant. It was Broughton who is responsible for the name "Honolulu." Called by the Hawaiians simply "the harbor of Kou," Broughton dubbed it "Fair Haven," which is *Honolulu* in Hawaiian.

Kotzebue's is the earliest surviving chart of Honolulu, preserving the harbor in its natural state. As with Kotzebue's other charts of bays and harbors, the Honolulu chart is important not only for its detail and accuracy, but additionally for the topographical features he included. If merely useful landmarks for his contemporaries, these are now invaluable records of what occupied Hawaiian shores during this critical transitional period. He records the interconnected, irrigated fields where the Hawaiians grew taro, and the coral stone fish ponds by Nuuanu Stream and southeast of the harbor entrance, contained on both sides by a broad coral reef, and shows the then new fort. Two details are illustrated in Figs. 152 and 153. The entire chart can be seen as the inset on the map of Krusenstern (Fig. 151). The coordinates for their anchorage were fixed with remarkable accuracy. Latitude, derived from the "mean of our daily observations," was determined to be 21° 17'57", and longitude, calculated from "the mean of lunar observations, which were repeated for several succeeding days," was 157° 52' 00″ W. This would correspond to what is now Kakaako Park.

Kotzebue's mapping of southern Oahu brought him the island's splendor. On the morning of December 8, 1816, "at nine o'clock, provided with a small compass and a pocket-sextant, I began my journey with Dr. Eschscholtz, and first mate, Chramtschenko, who was to assist in surveying and making plans of the coast." Having walked inland from Honolulu for a couple of hours, they stopped in a "romantic valley, where we seated ourselves under shady bread-fruit trees, on the banks of a salt lake, the owner of which, a distinguished Jerri, derives considerable profit from it, as the banks of this lake are covered with the finest salt." There a type of flightless bird was seen, and one specimen shot. Kotzebue used conjecture about a certain wild duck's migratory patterns to theorize that an undiscovered Pacific island lay at about 45° N.

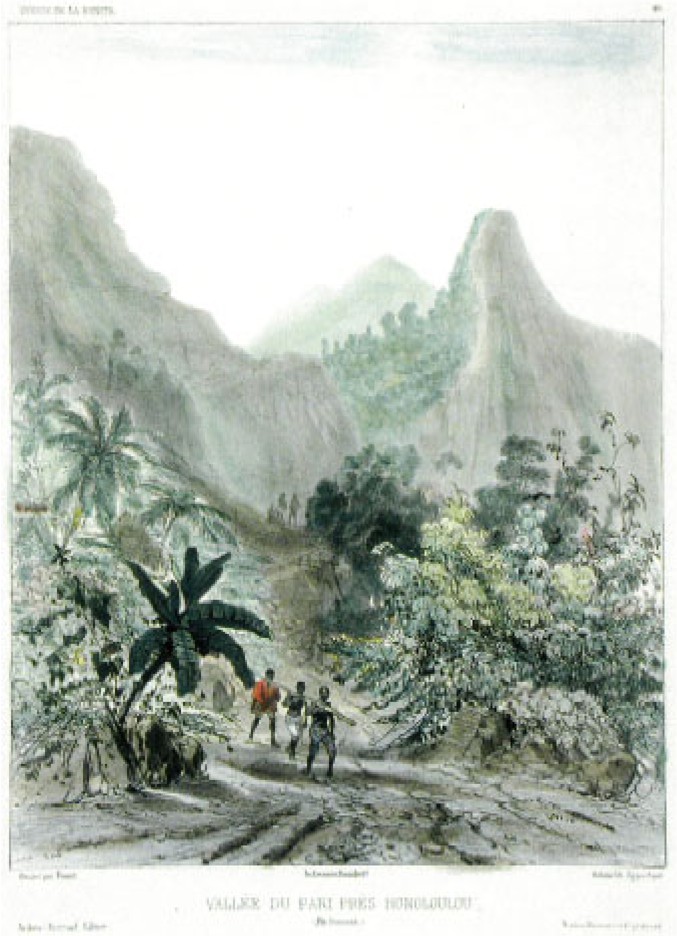

VALLÉE DU PARI PRÈS HONOLOULOU

Fig. 154. View of the Pali (Oahu), from Auguste-Nicolas Vaillants 1836-7 visit in the corvette *La Bonite* (Bertrand, ca. 1840). "The most singular spot" wrote Byron when visiting Oahu in 1825, "is, undoubtedly, the Parre [Pali], or precipice, on the weather side. The path

which leads to it from Honolulu winds along the beautiful and fertile valley of Anu Anu, and thence ascends gradually, for eight miles, through a cultivated and populous district, separated, by a pretty stream, from a thick wood, which we crossed, completely sheltered from the midday sun, and found ourselves suddenly on the brink of a precipice some thousands of feet above the grassy plain below. The descent to this plain, which, like that of Honoruru, extends to the sea, is the most fearful imaginable. In many places the path consists of little more than holes cut in the rock for the hands and feet; and, where most commodious, it lies along narrow ledges, where a false step would be inevitable destruction." And indeed, Byron then cites the famous victory of Kamehameha, who drove his adversaries off the pali to leave him the island unopposed. This dramatic pass is now spanned by a modern highway

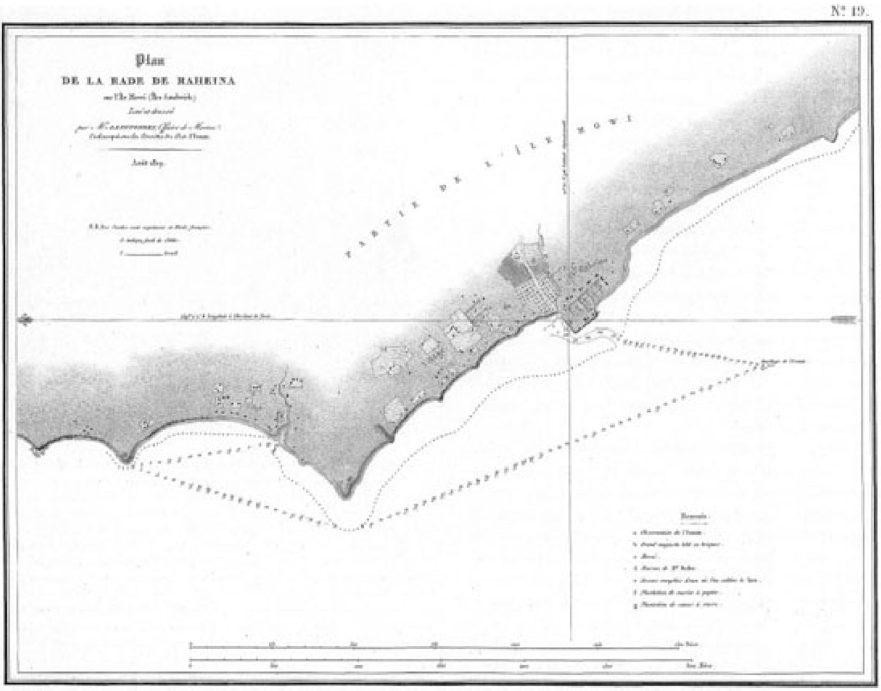
Kotzebue tried to fix the height of the islands' principal mountains, reversing the relative heights of Mauna Loa and Mauna Kea. Such estimates, even if not cited numerically on maps, helped with the growing use of three-dimensional shading to depict mountains and other topographical features, though this technique was difficult to regulate and often produced misleading impressions of height. Mountain height was of concern to navigation for the effects it had on winds. "I advise every navigator who sails from Owhyee to Woahoo," Kotzebue wrote, "to keep near the coast, where the land and sea-winds blow the freshest; whereas at a distance of the several miles from land, calms prevail, which are caused by the Mouna Roa."

While in Hawaii, Kotzebue was told by a Mr. Wilcox, owner of an American vessel, *Traveller of Philadelphia,* of islands discovered by a Captain Andrew Walther, "low coral islands, over-grown with woods," and about 30 miles in circumference. He fixed the latitude at 3° 48' and the longitude, by chronometer, at 159° 15'. This was probably an independent "discovery" of Tabuaeran, first found by Edmund Fanning in 1798, in the Line Islands (Kiribati).

Kotzebue lamented the harm being done Hawaii by the dregs of sailors and missionaries alike. "It is to be expected that the good disposition of the Sandwich islanders will soon be entirely corrupted," he wrote, referring to the influence of the many sailors that were taking up residence in the islands after being discharged from their service for bad conduct. But "the missionaries do them almost more injury, because, by the religious hatred which they excite, they destroy whole nations."

Change, indeed, was dramatic. Whaling ships began arriving in 1819, and a company of missionaries on the *Thaddeus* the following year. The need for a pier in Honolulu Harbor was first remedied in 1825 by sinking the hull of a derelict ship, near what is now Pier 12, where Nuuana Avenue and Bethel Street end.

Fig. 155. Lahaina, Maui, charted by Louis Duperrey in 1819 while on the Freycinet expedition, and published in 1826. [Lahaina Printsellers, Ltd]


Nº 19.
Plan
DE LA RADE DE RAHEINA
PARTIE DE L'ILE MOWI

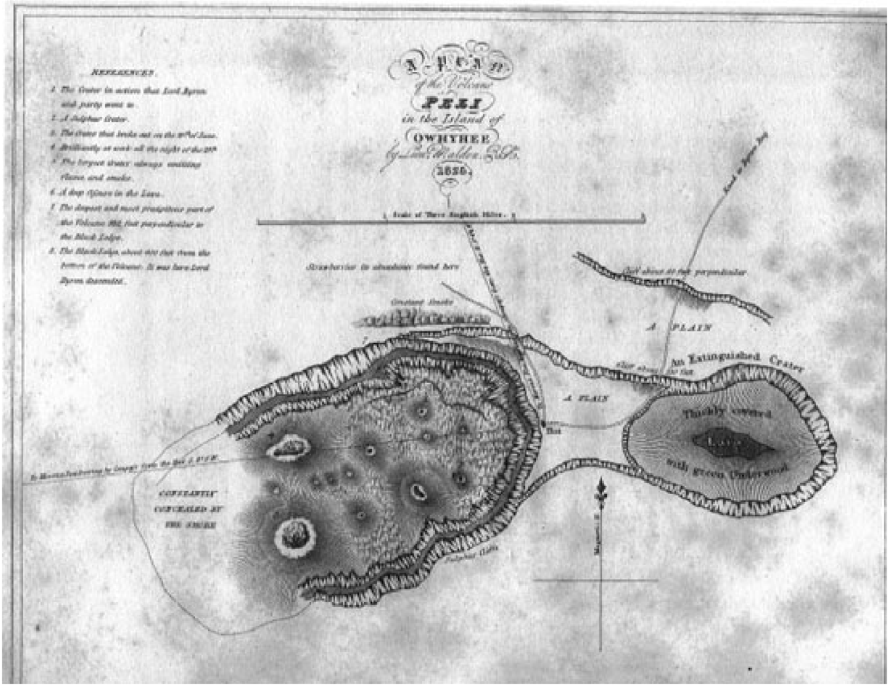

REFERENCES.
A PLAN of the Volcano
PELI
in the Island of
OWHYHEE
by Lieut. Malden, R.N.
1825.
Scale of Three English Miles.
Strawberries in abundance found here
A PLAIN
An Extinguished Crater
Thickly covered
Lava
with green Underwood
A PLAIN
Hut
CONSTANTLY CONCEALED BY THE SMOKE

Fig. 156. Kilauea volcano, Hawaii, by Charles Maiden, 1826. "Words are totally inadequate to describe the effect produced on us by the first sight of that dark fiery gulf. From its brink, where we stood, we looked down for more than thirteen hundred feet, over rocks of lava and columns of sulphur, between whose antique fissures a few green shrubs and juicy berry-

> bearing plants had fixed themselves, to a rugged plain, where many a cone, raised by the action of the fire below, was throwing up columns of living flame, and whirls of smoke and vapour, while floods of liquid fire were slowly winding through scoriae and ashes, here yellow with sulphur, and there black, or grey, or red, as the materials which the flames had wrought on varied…. Not less than fifty cones, of various height, appeared below us as the funnels of the various operations going on. At least one half of these were in activity, but it appears that the same are by no means constantly so; nay, that often older cones fall in, and new ones are formed elsewhere in the bottom of the pit…. Night increased the magnificence, perhaps the horror, of the scene. The volcano caused what Defoe calls a terrible light in the air'. The roar occasioned by the escape of the pent up elements, and the fearful character of the surrounding scenery, suited with that light; and all impressed us with the sense of the present Deity, such as when from Sinai he gave, with thunderings and with lightenings, the tables of the law."

Louis Freycinet reached Hawaii from the Marianas in August 1819. In charge of Freycinet's hydrographic surveys was Louis Duperrey, later to achieve fame on his own Pacific voyage. First visiting the island of Hawaii, Duperrey surveyed Kailua (his *Kayakakoua)* and Kawaihae Bay *(Kohai-Hai)*. From the "Big Island," the *Uranie* moved to Maui, where the first chart of the growing town of Lahaina was composed (Fig. 155). The coordinates of Lahaina were placed with great accuracy, longitude being set at 159° 02' 02 " west of Paris, which is within a few kilometers of true, depending on his exact observation point. Oahu was visited and Honolulu (Onorourou) surveyed, complementing the charts of the harbor already made by the Russian expeditions of Otto von Kotzebue (1816) and Vasili Golovnin (1818).

An American captain in charge of a British whaler, calling at Honolulu in 1823, was retained by King Liholiho and Queen Kamamalu to bring them and their retinue to England. Within several weeks of their arrival, both were dead from London's measles epidemic. George Anson Lord Byron was assigned the task of returning the bodies to their home. Kapihe, a Hawaiian chief, died of the disease during the voyage back. The sad troop, in the vessel Blonde, reached Hilo on May 3, 1825, where their five chronometers were used to fix longitude at 155° 20', a point about 25 kilometers inland from Hilo. Then, in "double-hilled Maui," the longitude of Lahaina was measured at 156° 05', a less accurate figure than that earlier ascertained by Duperrey.

In Honolulu, their next anchorage, Byron was taken by the extent to which Hawaii had already became internationalized. Byron remarks on the "artifacts" industry that had already developed to satisfy the European demand. He met a Tahitian man who had served in the British Navy and fought in Algiers, and when two of his scientists investigated the Pali (Fig. 154), they stayed with a Bengali tailor who had been shipwrecked on the island and was now raising a family with his Hawaiian wife.

Port duties were already a contentious issue. Prices were being leveled: enough Hawaiian chiefs had visited other countries, "nay, some of whom have been brought up in the United States," that the international value of what they sold and purchased was now better known to them, "and they are naturally unwilling to trade but upon equal grounds."

From Oahu, the *Blonde* sailed back to Hawaii, where equipment failure marred an attempt to measure the height of Mauna Kea. A trying ascent to the top of this highest Hawaiian mountain was beset by problems: half the party, including the surveyor, were separated when delayed by extreme fatigue, then took a wrong turn and reached a summit short of the top, but separated by a ravine which could not be passed without provisions. When the other party, with a botanist and a missionary, reached the summit, their theodolite (surveying instrument used for measuring horizontal and vertical angles) had been damaged in the ascent and was useless. Their estimate of Kea's height, 15,000 feet, was nonetheless better than earlier, higher figures.

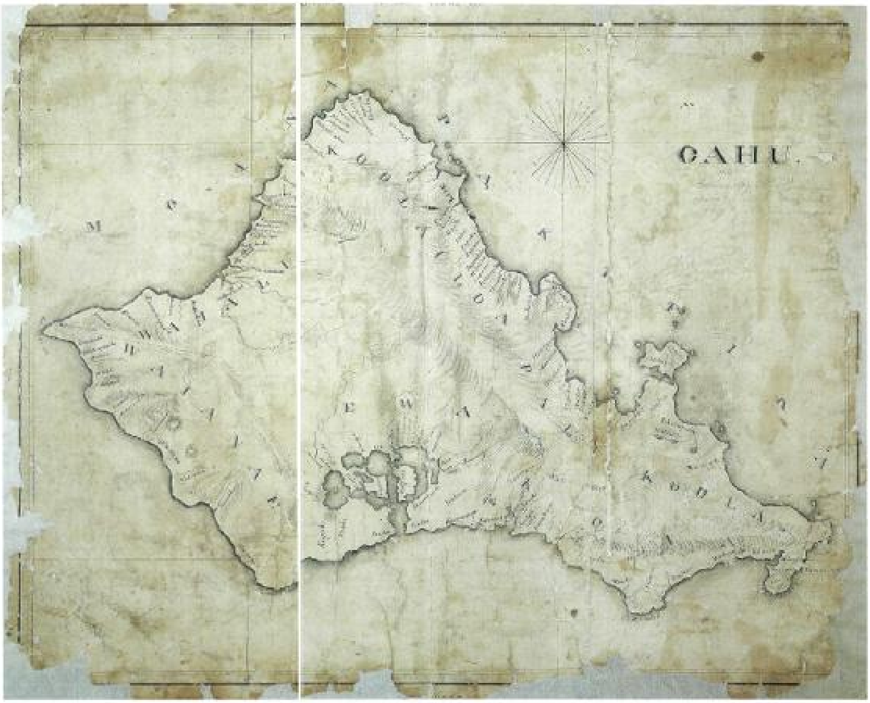
Instrument malfunction also beset the mapping of Kilauea. A party ascended this legendary home of the goddess Pele, and a lieutenant on the mission, Charles Maiden, mapped the active volcano for the first time (Fig. 156). A barometer was taken along to enable the mountain's height to be computed by atmospheric pressure at its summit. But as the barometer was not working properly, Maiden resorted to approximating the mountain's incline—"about two feet in a hundred"—and since "the ascent, though gradual, is constant," he computed the height from Byron Bay, which he placed 28 miles distant, to be 3,000 feet. This is less than actual, but a reasonable estimate given the circumstances. Triangulation was used to determine the circumference and depth of the crater.

While their first night on Kilauea was characterized by "soft fire showers that seemed to rain down upon the burning plain," in the middle of the second night "we were awakened by a violent earthquake; and soon afterwards a fresh crater opened in the gulf immediately below us, with tremendous noise, and flame, and stones, and smoke. The plain at the bottom was overflowed with fresh streams of lava in every direction, and a continual heaving even of the cool dark mass, and a tremulous motion of the side where we were, filled us with an involuntary dread…."

The lines extending to the top and left of the map are compass bearings to Mauna Kea and Mauna Loa, respectively, though the engraver has mistakenly labeled both as Loa, and corrupted Maiden's compass readings. The lines converge at the party's hut, just at the edge of the larger, westerly crater.

Charles Wilkes of the United States Exploring Expedition surveyed the Hawaiian Islands during 1840-1. He was particularly interested in Hawaii's volcanos, and so assembled 200 Hawaiians to guide him and his colleagues up to the top of Mauna Loa and carry their vast array of equipment. The party left the peak in mid-January and reached Hilo ten days later by way of Kilauea. Among Wilkes's experts on volcanos was young James Dwight Dana, who had gained experience in studying volcanos at Vesuvius (Naples). It was understood that the Hawaiian islands ran progressively younger to the southeast, and Dana believed that some other Oceanic island chains were similarly arranged. Dana, whose geologic interests extended to the moon, helped form ideas about the mapping of the Pacific bottom, believing that the islands' alignment was the result of volcanic activity along a fissure zone on the ocean floor.

Fig. 157. Manuscript map of Oahu attributed to Ursula Emerson, 1833. [Hawaiian Historical Society]



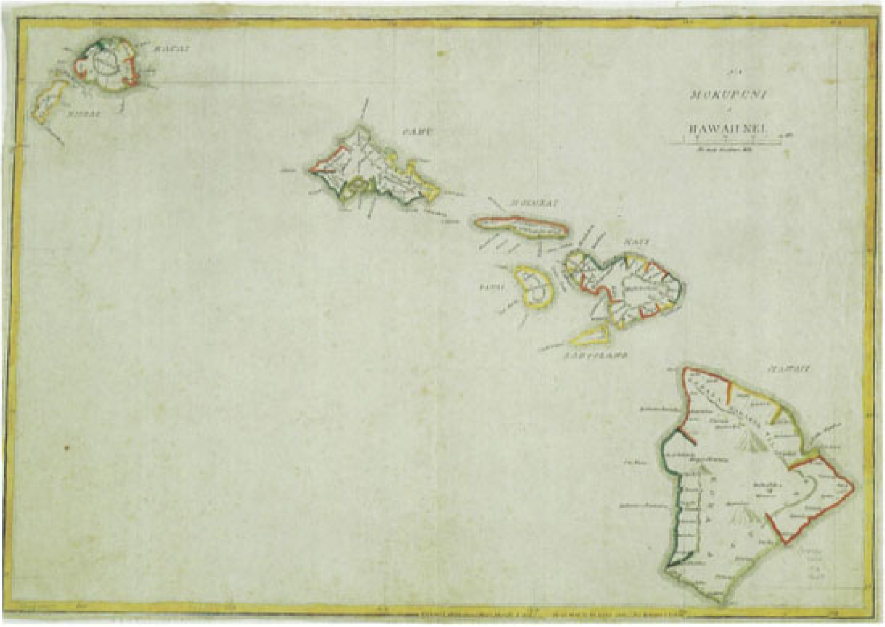


Fig. 158. Map of the Hawaiian islands printed at the press of the missionary school in Lahainaluna, Maui, in 1837. [Library of Congress]

Ancient Hawaiians had ascended Mauna Loa by the shortest, steep trail. A member of Cook's crew, John Ledyard, ascended part way up the mountain in 1779, and in 1794 Archibald Menzies of Vancouver's expedition reached the top (Mokuaweoweo). Wilkes's group, the first to conduct a geologic survey, set camp at what they named Pendulum Peak in December 1840. A number of pendulum observations were conducted at the summit.

At the time it was not known which was the highest point of the archipelago—Mauna Loa, upon which he then stood, or Mauna Kea, on the same island. "It was not without some nervous excitement that I placed my instrument on the highest point of Mauna Loa, within a few feet of its crater," Wilkes said, aiming it toward Mauna Kea to the NNE, measuring that it was Mauna Kea in the distance that was slightly higher, finally establishing the correct relative heights of Hawaii's volcanoes. During the course of about three weeks that were devoted to the mapping of Mauna Loa, one of the surveyors descended into the crater of Mokuaweoweo to measure angles and determine its depth. Wilkes's efforts resulted in an accurate longitude reading for the peak—155° *37',* within a few kilometers of true.

Next the party mapped Kilauea. Although Kilauea is less than a third of the height of Mauna Loa, its active lava posed a constant risk. One of the party was nearly lost to an unanticipated flow, and both he and his Hawaiian rescuer received burns. Flags were again placed in key points on the crater to survey its depths. In contrast to the success at Mauna Loa, longitude of Kilauea was placed at 155° 28'—perplexingly far west after the Mauna Loa figure.

Among the people who commented on Wilkes's faulty longitude for Kilauea was W D. Alexander (Fig. 162), who later became the founder of the Hawaiian Government Survey. Alexander saw that the error affected Wilkes's mapping of the entire southern coast of Hawaii, since the coast was placed in relation to the volcano. He told James Dana that the volcano was placed eight and a half minutes too far west, which was a fair assessment of the error.

Large-scale charts of Hawaiian harbors and bays were also produced by the US Exploring Expedition. Along with charts of the busiest harbors, Lahaina, Hilo, and Honolulu, Wilkes surveyed Waimea, Wahiawa, and Nawiliwili on Kauai; Kaneohe on Oahu; and the entrance to Pearl Harbor. Two general charts of Hawaii were compiled for the Expedition's atlas, though these, which drew in part from the maps of Cook and Vancouver, did not always agree with Wilkes's harbor charts.

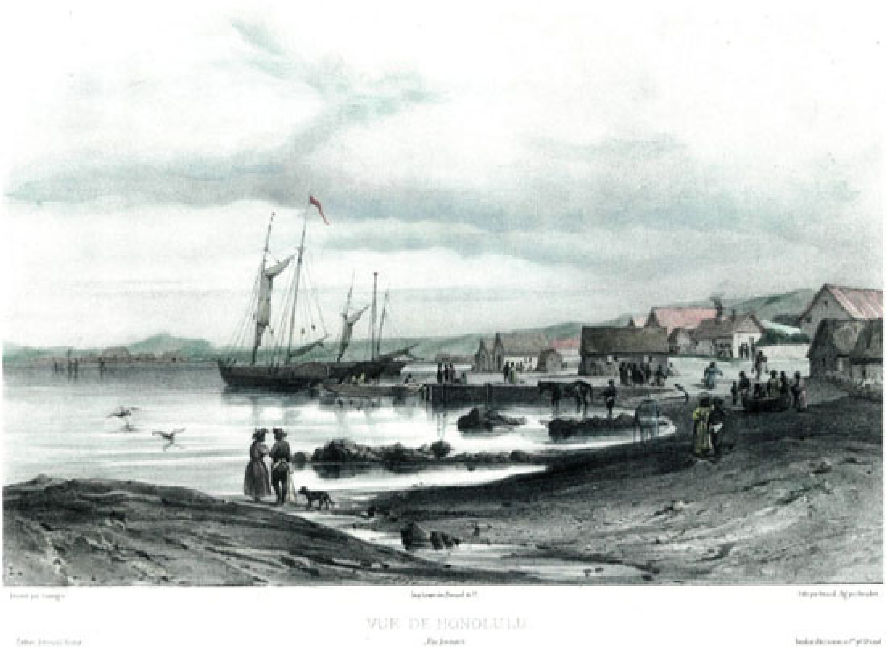


Fig. 159. Honolulu, facing northwest toward the Waianae Mountains. From Vaillant's visit in 1836-7. (Bertrand, ca. 1840).

Missionaries and the Mapping of Hawaii

While such surveying expeditions as Wilkes's were interested in the economic and political benefits of Pacific mapping, the newly arriving missionaries were interested in maps as a teaching tool for converted islanders. The earliest surviving maps of Hawaii created by a missionary are three from 1833 of Oahu, Kauai, and Niihau. These are attributed to Ursula Emerson (Fig. 157), and were apparently based on originals by J. Denison, who is cited as the source on the map of Kauai. Little is known about Denison beyond that he had begun a survey of the Sandwich Islands at the request of the missionary Levi Chamberlain.

The most prolific missionary center of map production was Maui. By the 1830s, the whaling town of Lahaina had become Hawaii's principal port, and thus a center for the West's proselytizing efforts as well, particularly given the "sinful" reputation of the whalers. In 1831, American missionaries selected a lovely area slightly upland from Lahaina, called Lahainaluna ("above Lahaina"), to make a high school for Hawaiians, and chose Lorrin Andrews, a native of Connecticut who had arrived in the islands three years earlier, to head it. Seeing the value that mass production of teaching material would be for their cause, in January 1834 Andrews had a printing press built at the Lahainaluna school, from which religious, geographic, and mathematical texts were produced. Andrews also saw the value of mass-producing maps, which missionaries had thus far copied by hand. No one at the seminary had the expertise or the equipment for printing, however, so a crude press was constructed according to an encyclopedia illustration, and copper used for sheathing on the ships calling at the port below was obtained to make the engraved plates. Andrews' resourcefulness was rewarded in November 1834 with its first fruit, a simple map of the world.

Small atlases and separate maps were produced during the first few years of the project, though little is extant due to their fragility, heavy use, and the relatively small numbers made. A map of Hawaii made in 1837 (Fig. 158) sufficed for student use, giving a generally accurate, if unrefined, idea of the islands. The following year, a large map of the islands on eight sheets was produced with some improvements and considerably expanded nomenclature.

Opinions on longitude did not remain stagnant during the brief time between these two maps. Their own location, Lahaina, is actually a bit better placed on the rough 1837 map than the large one. Both misplace Oahu to the west. For example, Kahuku Point (northernmost Oahu), which had been mapped correctly by Vancouver, is here off by about 12 kilometers. Kauai fares far worse, being placed fully 40 kilometers too far to the west, though Niihau, the channel between it and Kauai being understated, recovers some of that discrepancy. Hilo is a bit too far west on the 1837 map, but is better placed on the large, 1838 map. Both misrepresent prominent Kahiu Point (northern Molokai) as a gentle contour.

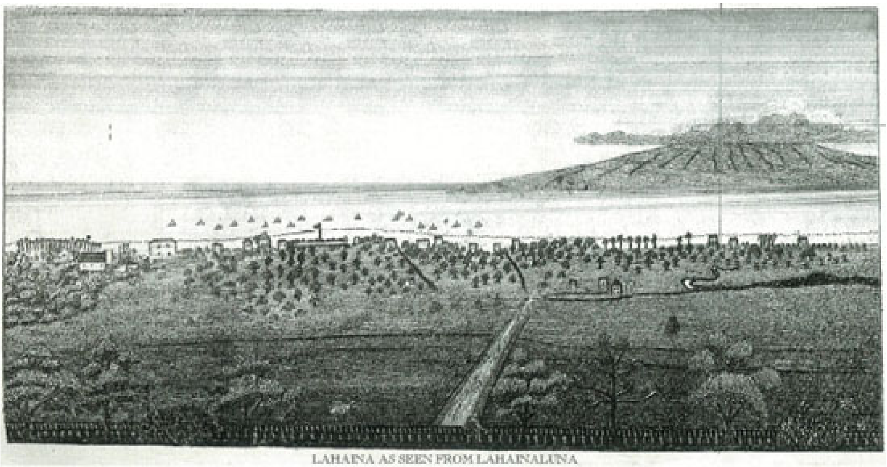

LAHAINA AS SEEN FROM LAHAINALUNA

Fig. 160. Lahaina, as seen from Lahainaluna, with Lanai and Molokai in the distance (Dibble, 1843). George Byron, visiting Lahaina in 1824, wrote that "from the beach to the mountain a perfectly flat plain extends from three quarters to half a mile in breadth; and this plain is richly covered with vegetation of all kinds, and studded with trees … the irregular patches of native culture destroy the grace of nature without giving the dignity of civilization." [Lahaina Printsellers, Ltd]

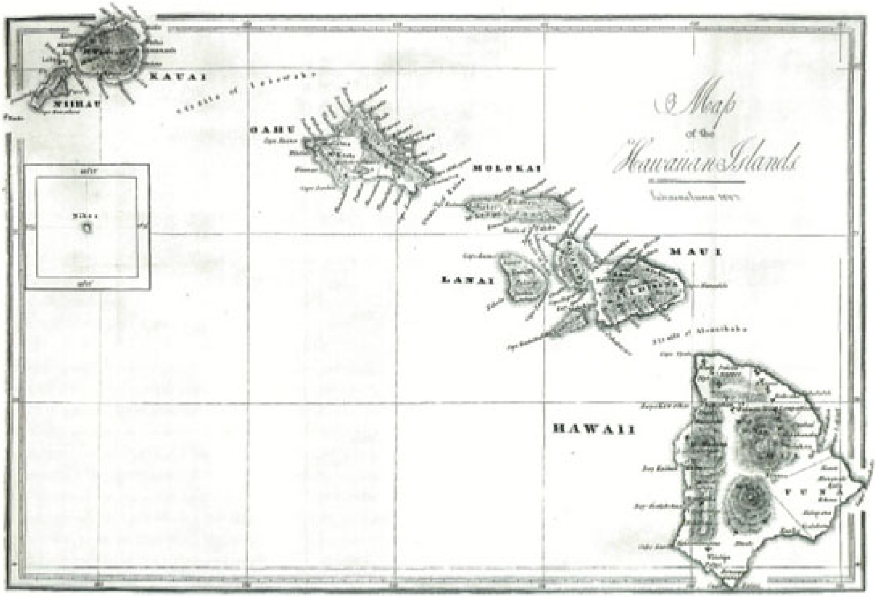

KAUAI
NIIHAU
OAHU
MOLOKAI
MAUI
LANAI
HAWAII
Map of the Hawaiian Islands

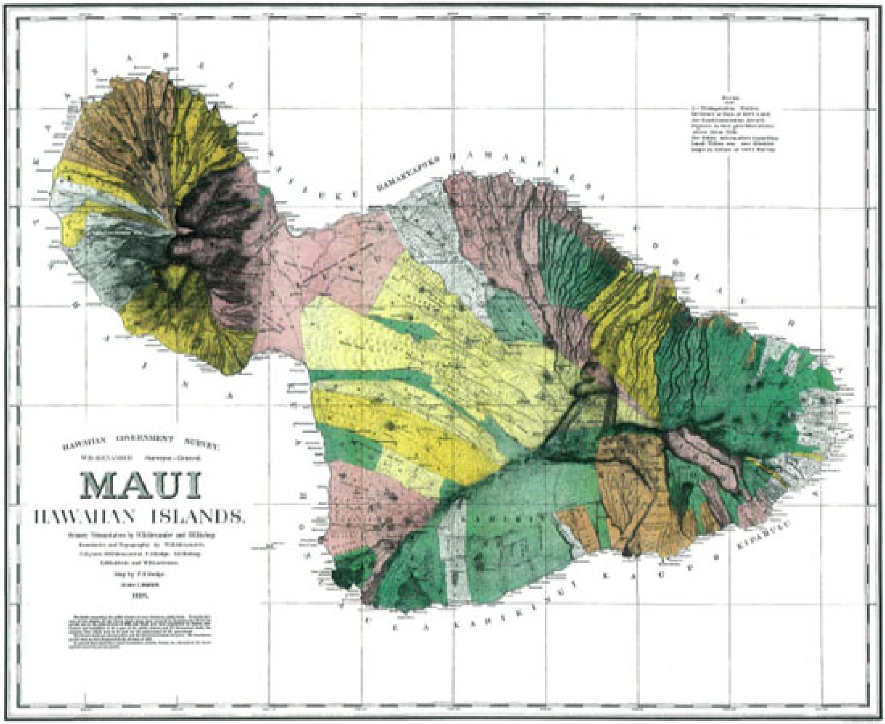
Fig. 161. Map of the Hawaiian islands from *History of the Sandwich Islands,* Sheldon Dibble, 1843, produced at the Lahainaluna School. [Lahaina Printsellers, Ltd]

Late in 1837, in between the production of these two maps, a history teacher at the school, Sheldon Dibble, returned to his native New York, his wife having died in Hawaii earlier that year. He lectured extensively about the islands and the missionaries' efforts, and in October 1839 returned to Lahainaluna with his new wife. Dibble, considered among the foremost of missionary figures, translated part of the Old Testament to Hawaiian, wrote textbooks for the school in Hawaiian, and was a strong force in suppressing the "sports and amusements" of which Hawaiians were so fond. Of several Hawaiian pastimes he considered dangerous, "the greatest evil of all resulted from the constant intermingling, without any restraint, of persons of both sexes and of all ages, at all times of the day and at all hours of the night."

In 1843, the press at Lahainaluna produced his *History of the Sandwich Islands,* containing a map (Fig. 161) printed by his students. Given the school environment and narrow time frame of these earliest Lahainluna maps, it is intriguing that no one model became a set prototype. Dibble's shares some of the short-comings of the earlier maps, but the Waialua coast of Oahu is better formed, and Kahiu Point assumes a better shape. Most importantly, the island of Nihoa, a dramatic island of towering cliffs and unprotected surf lying 245 kilometers to the northwest of Kauai, is shown by an inset, placed with a longitudinal error only about half that of Kauai. The island, inhabited by Polynesians in ancient times, was rediscovered by William Douglas in the *Iphigenia* in March 1789 after a stop in Hawaii en route from the Northwest Coast to Macao, the only discovery of his voyage.

Nihoa became better known in 1822, when Queen Kaahumanu, during a visit to Kauai, sent William Summer to annex it. Also known as Bird Island, Nihoa's coordinates were fixed by a US survey schooner in 1859, and in the same year a US sealing ship, the *Gambia,* discovered Midway Atoll, the last of the Hawaiian chain to the northeast.

Fig. 162 Large-scale lithographed map of Maui, 1885, by W. D. Alexander, founder of the Hawaiian Government Survey.


HAWAIIAN GOVERNMENT SURVEY.
MAUI
HAWAIIAN ISLANDS.
HAMAKUAPOKO
HAMAKUALOA
KIPAHULU
KAUPO
KAHIKINUI

Chapter 9

The Eighteenth Century after Cook

The revolutionary advances in the mapping of the Pacific at the hands of Cook and those immediately preceding him gave rise to a new wave of exploratory voyages that continued the work of searching for shores to inventory, with precision being a second priority. This would change dramatically in the nineteenth century, when more detailed, large-scale surveys were undertaken, but for the time being the various major gaps left by Cook needed to be filled in. One of the first of those gaps to be rectified was Cook's failure to investigate the northern Tongan islands.

The Galician navigator Don Francisco Antonio Maurelle made a number of discoveries in the Southwest Pacific in 1781 as a result of attempting an eastward crossing along latitudes other than those well proven for the purpose. Leaving Manila in late November 1780, an inopportune time of year for the sail to Mexico via the traditional northern route, he decided to attempt a new route through the central and southern latitudes. This proved futile. Ultimately he gave up and sailed north to catch the same winds that propelled routine Spanish crossings, but in the attempt, Maurelle came across islands not previously known to Europeans.

Most significant of these was Vava'u, which James Cook had learned of, but failed to investigate, fourteen years earlier during his third voyage. On February 27, 1781, Maurelle, having woven his way past various Melanesian islands and skimming the Solomons, reached Tongan waters. Amicable trade with the people of Late was followed by the discovery of "an island right ahead, on which was a lofty mountain, appearing scorched at the summit, but exhibiting a pleasing verdure on its sides covered with trees." They stayed for nearly three weeks and provided a fine account of the island and its people. The French navigator Jean-Francois Galaup de La Pérouse, while in China, obtained a manuscript detailing Maurelle's voyage, from which the published map was made, recording Vava'u by both its proper name and that dubbed by Maurelle, "Majorca."

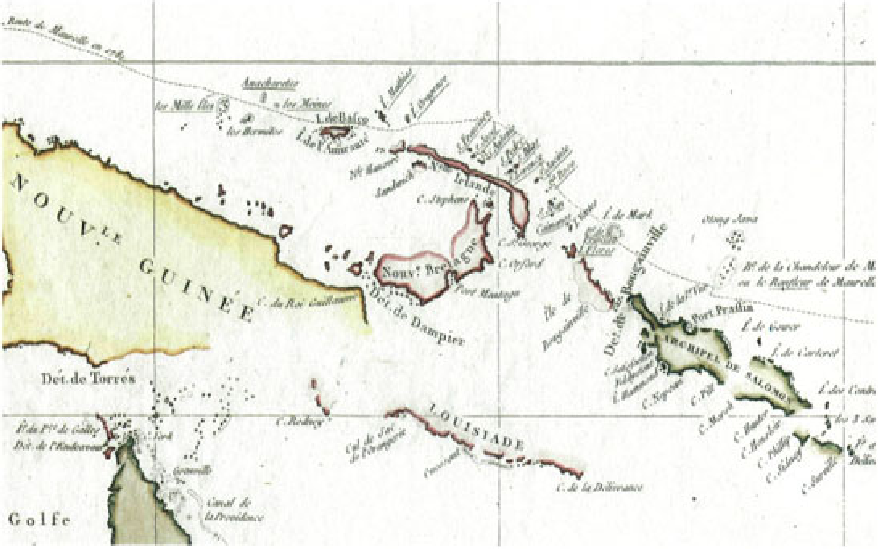

Nouvelle Guinée
Dét. de Torrès
Golfe
Nouv. Bretagne
Dét. de Dampier
Louisiade
Port Praslin
Archipel de Salomon
Dét. de Bougainville
I. de Bougainville

Fig. 163. Tracks of Francisco Antonio Maurelle through the Bismarcks and Solomons, in the *Atlas* published with La Pérouse's journal, 1797.

La Pérouse

La Pérouse had sailed from Brest on August 1785 with two frigates, the *Boussole* and the *Astrolabe,* hoping to fill in pieces of the map left wanting by Cook. Although the expedition ended in disaster, La Pérouse had sent back his charts and logs to France when call ing at ports with European connections, hence many of his maps survived (for example, Figs. 164–166). A formal atlas of his voyage appeared in printed form in 1797 (French) and in 1798 (English), though data from the voyage, as well as Maurelle's voyage, was published as early as 1791 in Jean Borde's *Atlas* .

To facilitate coastal charting, La Pérouse carried two pinnaces and a prefabricated jolly boat. As with Cook, international cooperation was secured for the fleet's safe passage through war or peace. Chronometers, of course, were carried—the devices had quickly become essential for any voyage—but nor were they yet entirely reliable. La Pérouse used lunar observations to check the still-experimental timekeepers. If clear lunar observation indicated that they were east of the position suggested by the chronometer, then the device was running fast; if west, slow.

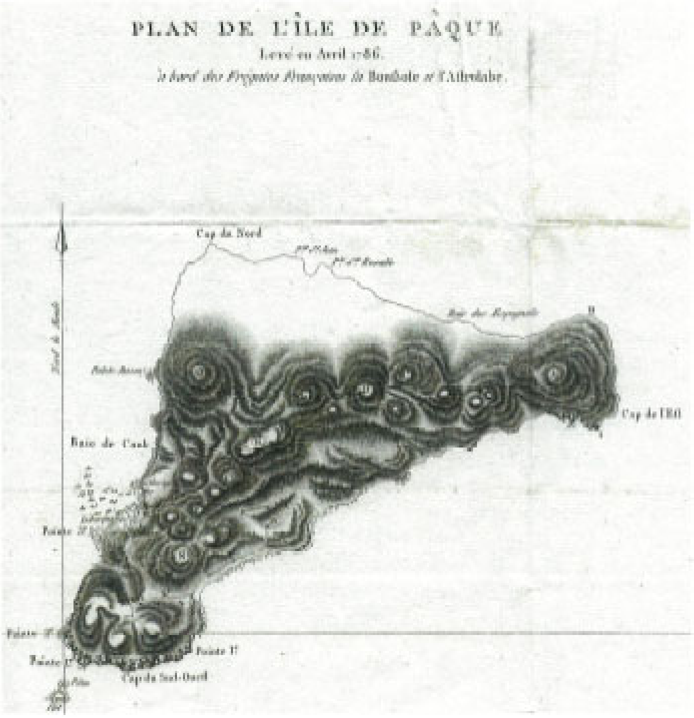

PLAN DE L'ÎLE DE PÂQUE
Levé en Avril 1786.
Cap du Nord
Baie de Cook
Cap de l'Est
Cap du Sud-Ouest

Fig. 164. Easter Island, from La Pérouse's *Atlas,* 1797.

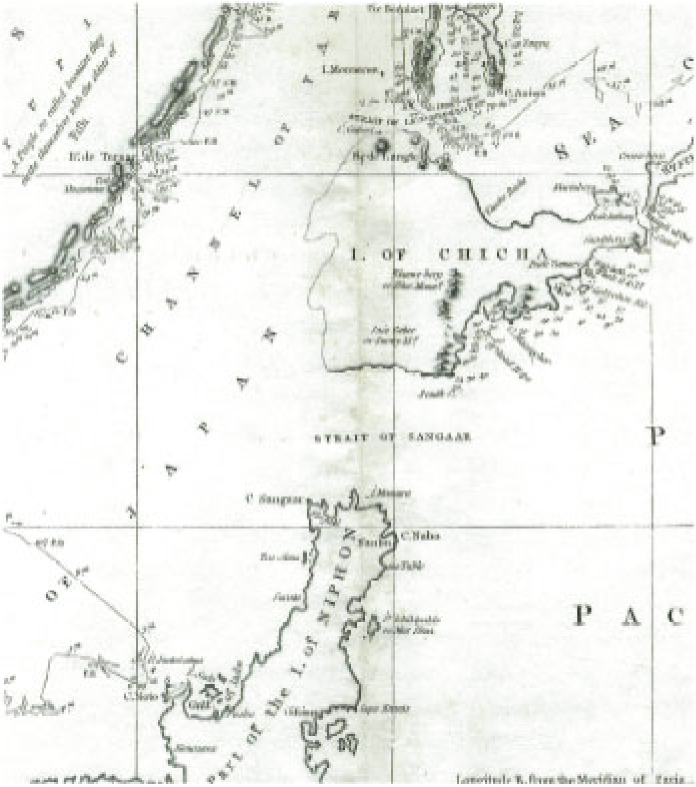


Fig. 165. Honshu and Hokkaido, from La Pérouse's *Atlas,* 1797.

His first mapping endeavor, in February 1786, was to help erase Davis Land from maps. The existence of that coast had been disproven several times already, to be sure, but the open expanses of the ocean, combined with the unreliable longitude of the original sightings, made such shores fairly indelible.

In April the fleet reached Easter Island and anchored in Cook's Bay. Though their stay in Easter Island was brief, a chart of their anchorage was made, sketches of the stone statues (Fig. 167) and their canoes drawn, and a perusal of the interior conducted. "The drawing of these monuments made by Mr. Hodges," the artist onboard the second Cook expedition, "was a very imperfect representation of what we saw," La Pérouse noted with justification. The engraving prepared for the account of his own voyage was romanticized as well.

The Easter Islanders, with whom the French visitors enjoyed good relations, did their own "mapping" of the Frenchmen's floating "island," using a cord to record the measurements of various items. "The exactness with which they measured the ship showed, that they had not been inattentive spectators of our arts; they examined our cables, anchors, compass, and wheel, and they returned the next day with a cord to take the measure over again, which made me think, that they had had some discussions on shore upon the subject, and that they had still doubts relative to it."

La Pérouse's orders called for Tahiti to be their next port of call, but the king had wisely given him the discretion to modify plans as per his judgment (his orders, included in the published account, were almost surrealistic in their magnitude and scope). As the approaching summer was perfect for tackling his mapping assignments on the Northwest Coast of America, Hawaii instead became the next stop. Fish habits, or fish responses to ships, were "mapped" along the way. Fish with the unmistakable harpoon wounds inflicted at Easter Island were sighted in Hawaii.

They reached the Alaskan coast in the area of Mt. Elias and made a detailed map of Lituya Bay, which La Pérouse named Port des Francais. Here the first of the expedition's tragedies struck: both pinnaces were lost while conducting soundings, at the cost of twenty-one lives. After survey work along the California coast and reprovisioning in Monterey, they crossed the Pacific, reaching Macao, where one of the expedition's naturalists left the company and carried its charts and logs back to France.

February 1787 brought the expedition to the Philippines, April to Taiwan and on north to become, in May, the first European vessels known to have pierced the strait between Korea and Japan and enter the Sea of Japan (Fig. 165). The strait was surveyed as they headed north, ending up on Sakhalin, the large island north of Hokkaido. The people on Sakhalin were cordial and helpful, and when La Pérouse inquired about the geography of the region, an old man sketched the opposing coasts of their land and the Asian mainland, placing Hokkaido to the south of Sakhalin, and— importantly—leaving a space between Sakhalin and the mainland, suggesting a strait between them.

La Pérouse was unable to sail far enough north to prove his belief that Sakhalin was an island, but succeeded in discovering the strait between it and Hokkaido, which is now named for him. In Petropavlovsk, Kamchatka, he gave the expedition's accumulated documents to Russian-speaking Viscount de Lesseps, who crossed Siberia and reached Versailles in October 1788. Here also La Pérouse received letters from Paris informing him of England's new colony in New South Wales, and instructing him to investigate it.

In late September, sails were set for the Bauman Islands of Roggeveen—Samoa—which had been renamed the Navigator Islands when Bougainville skimmed them two decades earlier. La Pérouse believed the islands to lie at 173° W of Paris, a figure he derived from the distance a Dutch chart gave between them and New Britain. "On the 6th of December, at three in the afternoon, we got sight of the most easterly of that Archipelago" and, wishing to anchor, "passed through the channel between the great and little islands that Bougainville left to the south." A mile distant from the shore, latitude was placed at 14° 7' S, the island point 14° 8' S. Consulting a map of the islands made on the Bougainville voyage, La Pérouse "found, that the island was not of the breadth indicated by Bougainville's plan." Reaching Maouna, the sea broke with great fury on the coral reef, but "in the creeks formed by several small projections of the coast there was room for canoes, and probably for our barges and long-boats to enter."

Like Roggeveen, he found glass beads to be in demand in the easternmost Samoas. There were a number of villages at the bottom of each creek, "whence came innumerable canoes, laden with hogs, cocoa-nuts, and fruit, which we purchased with glass ware. Such great abundance increased my desire to anchor, especially as we saw water falling in great cascades from the tops of the mountains to the bottoms of the villages." Brought inside a house, it "was my surprise, to see a large cabinet of lattice-work, as well executed as any of those in the environs of Paris. The best architect could not have given a more elegant curve to the extremities of the ellipses that terminated the building … this charming country combines the advantages of a soil fruitful without culture, and of a climate which renders clothing unnecessary."

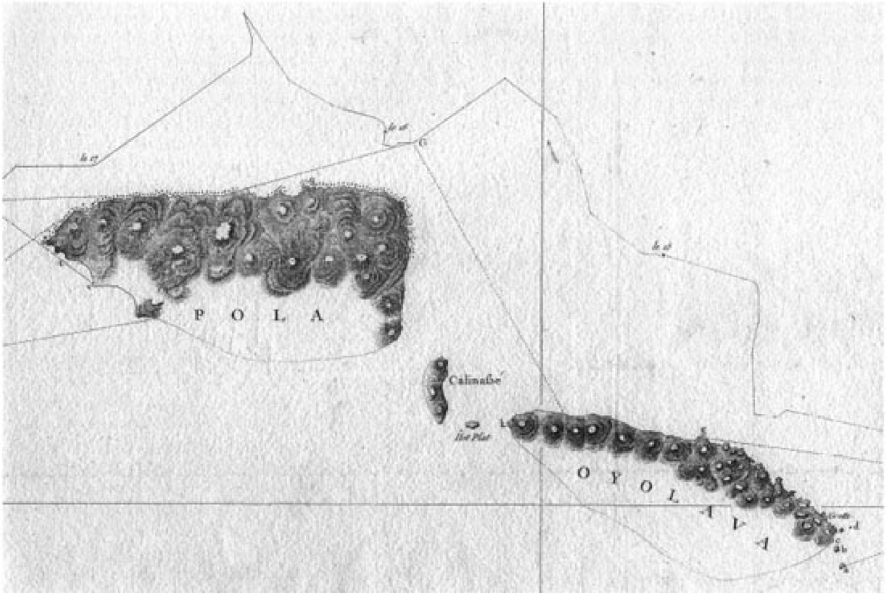


Fig. 166. The Samoan Islands of Savai'i (Pola) and Upolu (Oyolava), from a general chart of the archipelago published in La Pérouse's *Atlas,* 1797.

Although initial relations with the Samoans were excellent, tragedy struck when a final landing was made to secure water before setting sail from Tutuila. A crowd of Samoans attacked the longboats as they waited for higher tide to enable them to clear the coral. Twelve of the crew were killed and several others critically injured. The reason for the attack remains a mystery. A chart of the unhappy bay accompanied the atlas.

To La Pérouse's credit, this second disaster seemed not to prejudice the rest of his experiences in the island group. "Maouna, Oyolava, and Pola, (Tutuila, Upolu, Savai'i) may be numbered among the largest and most beautiful of the South Sea. The accounts of the different navigators present no picture to the imagination at all comparable to the beauty and immense extent of the village, to leeward of which we lay to on the north coast of Oyolava. Although it was almost night when we arrived there, we were instantly surrounded with canoes, that curiosity, or the desire to traffick, had brought out of their ports. Some of them had nothing on board, and only came to enjoy the novel sight we afforded them." Nor was European fascination with the islanders' social conventions dampened: "I am convinced, that in the Navigator Islands, at least, the young girls, before they are married, are mistresses of their persons, and that they are not dishonored by their complaisance," and that upon marrying "are called to no account concerning their past conduct."

His chart of Samoa (detail, Fig. 166) records the fleet's tracks in December 1787, entering Samoan waters from the east, where Ofu and Olosega of the Manua Islands are correctly depicted as being separated by a narrow strait. Like Tutuila, the islands comprising what is now the independent country of Samoa are not surveyed on their southern coasts, and as with American Samoa, the indigenous name La Pérouse applied to the westerly island now designates that on the east: *Oyalava* is Upolu, and *Pola* is Savai'i. The harbor of Pago Pago was not seen.

La Pérouse's latitudes for Samoa are near perfect, as one would expect; longitudes are about 20' too far east (his meridian 174° west of Paris, along the western part of Upolo, should properly be about 174° 20')- Bougainville's estimates, done without the benefit of the chronometer, suffered twice the error, being off by about two-thirds of a degree.

Vava'u, the northern Tongan island discovered by Maurelle, was La Pérouse's next call, where a week was passed in friendly offshore trading. In January 1788, the expedition reached Botany Bay as settlers and convicts were being transported to Port Jackson. Logs and maps compiled since the previous drop-off, in Kamchatka, were given to an English vessel for ultimate delivery to France. The great navigator sailed from Australia and was never heard from again. Thirty-nine years later, Martinique-born Peter Dillon discovered the remains of the expedition on a reef off Vanikoro.

The Rediscovery of the Solomon Islands

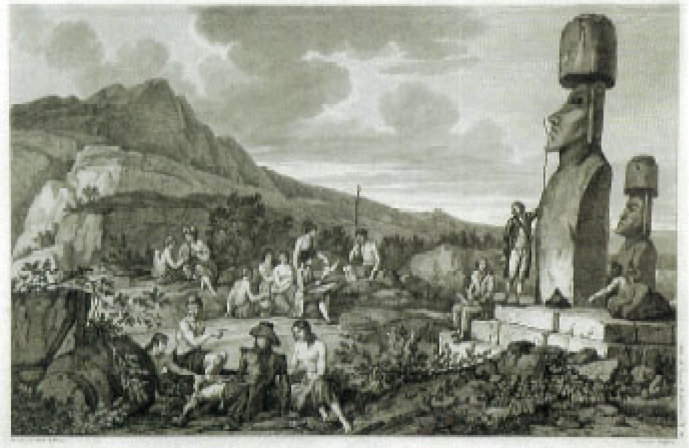
A key point La Pérouse was en route to investigate was a theory put forth by the French theorist Philippe Buache in his *Memoir on the Existence and Situation of Solomons Islands.* Buache argued that the Solomon Islands of Quiros, the whereabouts a mystery since their discovery two centuries earlier, had recently been rediscovered, but that the rediscoverers had been unaware of it.

An encounter with the group occurred three years in a row. In August 1767, Carteret skimmed the Solomons on the north, adding Ndai, Kilinailau, and Buka to the map. In June of the following year, Bougainville, during his dismal voyage from Tahiti to the Moluccas, discovered the large island named for him, along with several others. Then Jean Francois Marie de Surville, who in 1769 left India in search of a rumored isle of riches, discovere *Terre des Arsacids,* and sailed to several of the islands lying to the southeast of Bougainville Island.

Surville consulted a map of the Pacific by Vaugondy, on which the Solomons are placed to the northeast of Tonga, far enough to the east that he would never have suspected that his discoveries were the fabled islands. Data from the voyage were poorly disseminated, but once its reports could be evaluated, some geographers identified his discoveries with those of Mendana two centuries earlier. Buache reasoned that the Solomon archipelago must lie between Santa Cruz on the east and New Guinea on the west, and of all the sightings of the many who had crossed those seas, only these islands fit Quirós's evidence.

While La Pérouse did not live to test the theory, the man sent to discover his fate did: Antoine Raymond Joseph de Brunid'Entrecasteaux, who left Brest in 1791 with two vessels, the *Recherche* and the *Esperance.* D'Entrecasteaux's head surveyor was the young Charles Francois Beautemps-Beaupre, who would later be regarded as the father of modern French hydrography. When the expedition compared descriptions of the Solomons left by Quiros with the islands seen by Bougainville and Surville, they checked so accurately with those described by Quiros that Buache was vindicated and the now duplicated place names discarded: Carteret, for example, had given the name "Gower" to Santa Cruz, having believed it to be a new discovery. After two centuries of swimming about the Pacific, the Solomon Islands were affixed permanently on the map.

Fig. 167. La Pérouse and crew examine the great statues at Easter Island in 1786. When Roggeveen discovered the island, he remarked on the people's elongated earlobes and noted that no arms were to be seen amongst the people, who instead relied for protection on the enigmatic statues for which the island is famous. They "trusted entirely to the assistance of their idols, erected in numbers on the coasts. The statues were all of stone, of the figure of a man with great ears: the head adorned with a crown; the whole executed and proportioned according to the rules of art, which astonished us very much. Around these idols, at twenty to thirty paces, in a circle, there was an enclosure made of white stones." He found the Easter Islanders to be "in general, lively, well-made, strong, pretty slender, and very swift of foot. Their women are covered with red and white coverlids, and wear a small hat made of rushes or straw. They would often sit down near to us and undress themselves, smiling and enticing us to familiarities with them by every sort of gestures." From La Pérouse's *Atlas,* 1797.



INSULAIRES ET MONUMENS DE L'ÎLE DE PÂQUE.

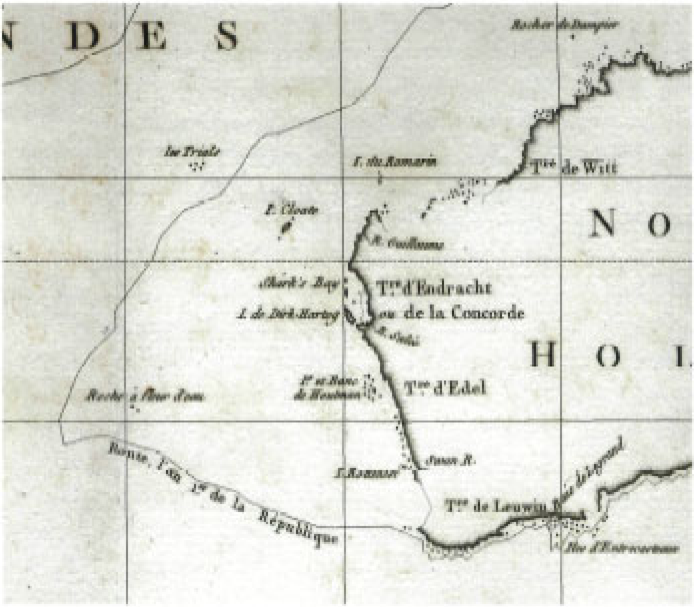

NDES
Rocher de Dampier
Ile Triale
I. du Romarin
Tre de Witt
I. Cloate
NO
R. Guillaume
Shark's Bay
Tre d'Endracht
ou de la Concorde
I. de Dirk Hartog
HOL
Ile et Banc de Houtman
Tre d'Edel
Roche à fleur d'eau
Route, l'an 1er de la République
Swan R.
I. Rottnest
Tre de Leuwin
Baie de Legrand
Iles d'Entrecasteaux

Fig. 168. The path of d'Entrecasteaux along western Australia in late 1792—what unknown to him would be "year 1 of the Republic." After discovering Recherche Archipelago and Esperance Bay (the map's *Bate de Legrand and lies d'Entrecasteaux),* low supplies forced them to continue to Tasmania, thus missing the Bass Strait. Nicolas Piron, 1800. *Opposite.* Fig. 170. Manuscript chart of the Santa Cruz Islands, Charles Francois Beautemps-Beaupre (?), ca. 1805.

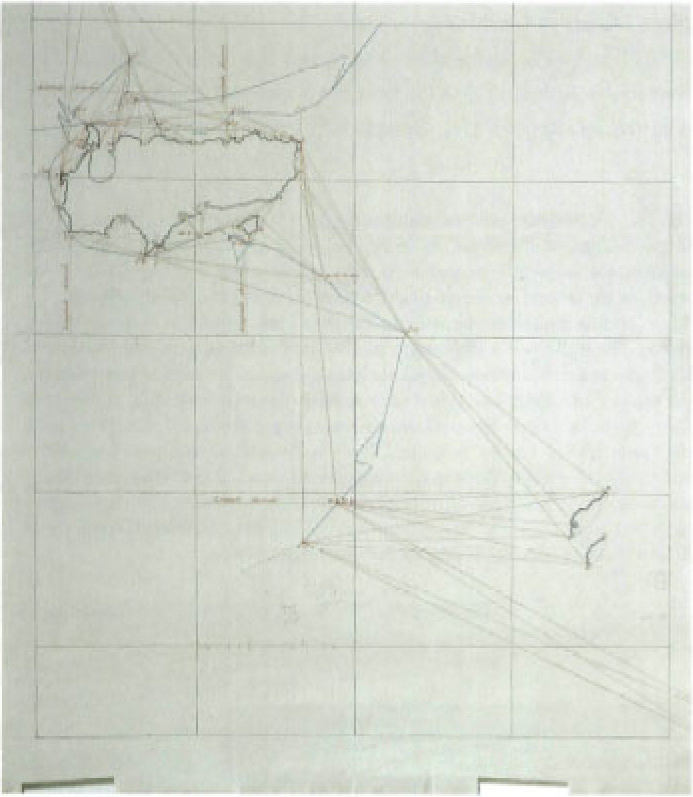


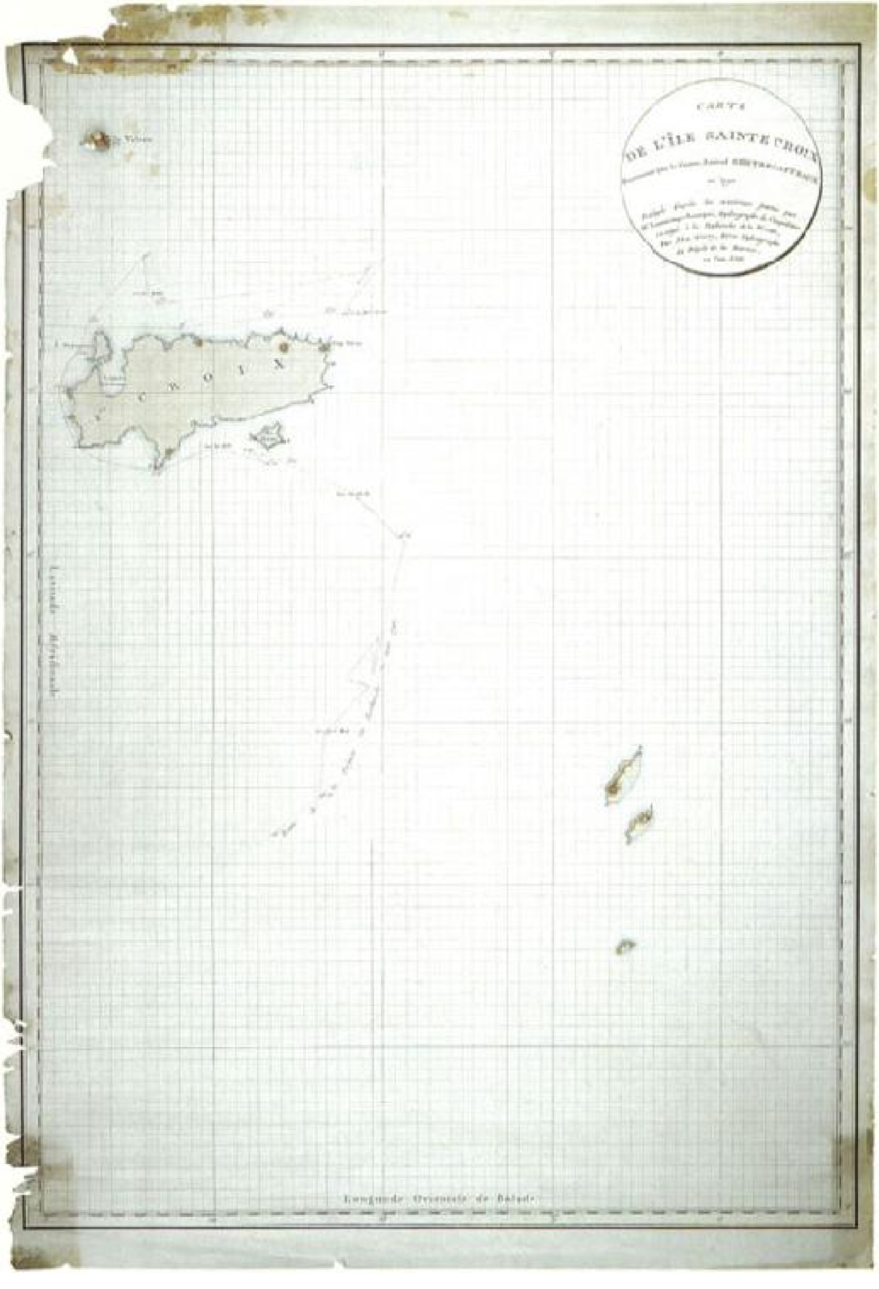
Fig. 169. A working draft for d'Entrecasteaux's map of the Santa Cruz Islands, probably from the workshop of Charles Francois Beautemps-Beaupre, ca. 1805. At the upper left is the highly active volcano of Tinakula that rises about 800 meters. Ndeni (Nendo), the large island, was the site of colonial aspirations by Mendaiia two centuries earlier. The two elongated, parallel coasts in the lower right are the single island of Utupua, whose odd shape —like two islands connected by a narrow neck—could have been construed as separate islands since only the northwest coasts were surveyed. The tab of paper in the lower right was retained to include the northwest coast of Vanikoro. Some of the calculations made to plot their readings were done directly on the map and are faintly visible.

The exercise was also of strategic value. These Melanesian islands lay in the path of many English ships returning from New South Wales. Three years earlier, an Englishman involved with the settlement of convicts, John Shortland, had investigated islands in the region of the Solomons while en route from Port Jackson back to England via Batavia. By having sailed east from Australia to clear that coast's dangerous reefs, he came across Middle Reef, then sailed north, which brought him directly to the Solomons. That he explored and gave the name New Georgia to the group of islands just southeast of Bougainville was viewed as a possible threat to French precedence in the area. (Shortland's voyage was disastrous, his crew plagued by scurvy. They made their way to Palau in September 1788, thence to Mindanao, by which point so many men had died that one of their two vessels was abandoned.)

D'Entrecasteaux approached the Pacific via the Cape of Good Hope, expecting to sail north of Australia in order to reach the Admiralty Islands as soon as possible. The urgency was because of a rumor circulating that the British captain John Hunter had seen Admiralty islanders dressed in French naval uniforms, the implication being that the clothing was from La Pérouse. In one of the many stranger-than-fiction incidents that dot the history of Pacific exploration, Hunter's and d'Entrecasteaux's paths actually crossed at the Cape, but Hunter sailed away a couple of hours later. Had the two captains met, Hunter would have made clear that the rumor was false, that he never saw any such thing.

Winds made the approach north of Australia impractical, so their course took them south of Australia. Their first major mapping endeavor was in Tasmania, where their markedly improved mapping of the island's southeastern region would lead to the establishment of HobartTown. From Tasmania, the expedition sailed northeast to investigate the southwest coast of New Caledonia. When Cook had discovered this long, diagonally oriented island on his second voyage, he had only been able to survey its northeast coast, and the Isle of Pines, the relatively small island separated from New Caledonia by barely 50 kilometers of coral sea. D'Entrecasteaux approached from the Isle of Pines and sailed along the opposite shores, thirteen days being spent filling in the map of its long, reef-strewn southwest coast.

Sails were then shifted to the Solomons. Just as New Caledonia had been mapped on the northeast but not the southwest, so had Bougainville been mapped by Bougainville on its north and eastern shores only. Beautemps-Beaupre remedied that omission. When Buka islanders approached the ship, d'Entrecasteaux had a resident musician play "a rather lively tune on his violin," to which the islanders "laughed and jumped on the seats of their canoes."


CARTE
DE L'ÎLE SAINTE CROIX
CROIX
Latitude Méridionale
Longitude Orientale de Balade

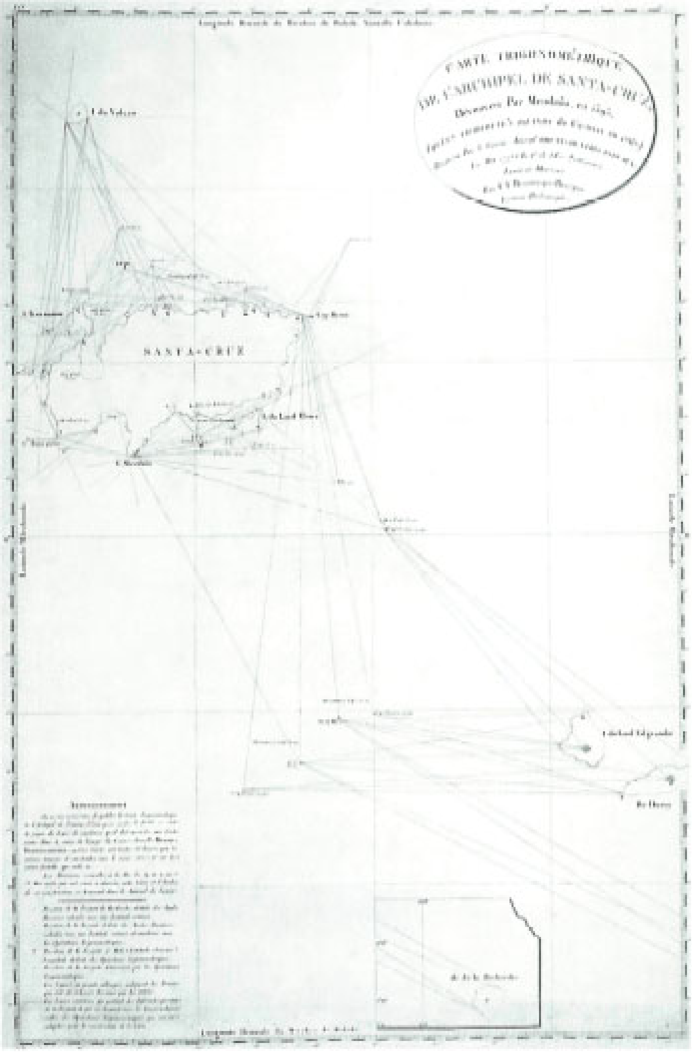


Fig. 171. Santa Cruz Islands, from Bruny-Dentrecasteaux, *Atlas de Voyage,* 1807. The chart covers the area from the little island of Tinakula in the upper left, through Tupua and Naunonga on the lower right. The date in the title, which refers to the time of the survey, is marked as "year 1" of the Revolution (1792-3).

Sailing then to the northwest, on July 17 they reached Dampier's New Ireland, where the expedition's naturalists were fascinated by a species of spider that constructed a defense against the incessant rains, and on July 26 they reached the Admiralty Islands, visited by Carteret twenty-five years earlier, where the intensity of the search for islanders in French costume yielded an equally meticulous mapping of the islands' coasts.

Discouraged at their failure to find any trace of La Pérouse, they sailed west to the north of New Guinea and anchored among eighteen Dutch ships in the Indonesian island of Amboina, resting and reprovisioning for five weeks. From Amboina, the fleet sailed south along the western Australian coast, making some new discoveries in the southwest (Fig. 168). Approaching Tasmania for the second time, d'Entrecasteaux suspected that a strait separated it from Australia, probably influencing the English explorers Bass and Flinders, who finally proved Tasmania to be an island in 1798.

Whereas d'Entrecasteaux had veered north from eastern Australia the first time, he now continued east, skirting New Zealand, then set his sights northeast for Tonga. A couple of minor discoveries were made in the Kermadec Islands en route. 'Eua was the first Tongan stop, the larger island of Tongatapu coming shortly after. An observatory was set up for astronomical observations, all the while pigs in abundance being secured at little cost, a steady supply of trading canoes about the ships maintaining a convenient source of food. D'Entrecasteaux had prohibited his crew from cavorting with the Tongan women, "but the sentries not being very strict in this point, many young girls easily evaded their notice, and were creeping in at the port-holes every moment." The finest articles of art purchased in Tonga were not of native manufacture, but rather from Fiji. This was neither a secret nor a mystery; the Tongans flaunted the objects' Fijian origins, readily acknowledging that they were superior to anything of their own creation.

The fleet's idyllic stay on Tongatapu ended on April 10, 1793, when they continued on to the west. Tanna in Vanuatu came into view on the 16th, and New Caledonia, which La Pérouse was supposed to have visited, two days later. Their surveying always combined with the search for the missing navigator, more astronomical observations were conducted during their more than three weeks' stay in New Caledonia.

A canoe with two sails arrived whose eight passengers spoke a Polynesian language, and therefore not from New Caledonia. But what was most unusual was that a varnished plank, clearly from a European vessel, was integrated into the hull of the canoe. They called their home "Aouvea" and said it lay a day's sail to the east— one of the Loyalty group. In hindsight, one wonders if the plank might have come from La Pérouse's wrecks.

Often the mapping and exploration of the Pacific seem the stuff of novels. Late May brought them to an island they could not find in their charts, which they named He de Recherche. Had they mapped this island as thoroughly as they had many others, they would have found the object of their quest, for they had discovered Vanikoro, the island with the carcasses of La Pérouse's vessels. One can only wonder if the two or more crew who are known to have survived on the island for some years, sighted the vessel sent to rescue them. But the reconnaissance was superficial (see Figs. 169–171). No anchorage was found, and sails were set for the Solomons about 500 kilometers to the west.

After an unfriendly encounter in San Cristobal, the expedition continued west and sailed along the southern coast of Guadalcanal, then on to the Louisiade Archipelago. Now sailing north, two archipelagos were discovered just north of the easternmost tip of New Guinea: a mountainous group being named for d'Entrecasteaux, and a low-lying group, later to become the focus of research by the anthropologist Bronislaw Malinowski, for Denis de Trobriand, senior lieutenant of the *Espérance.*

From here on, the expedition experienced a succession of hardships: ill-health, the death of d'Entrecasteaux among others, the seizure of both their ships in Batavia in payment for debts incurred, and internal squabbling between those crew siding with the Royalists and Revolutionists in France, this subtle class warfare the unfortunate "baggage" of France's political and social discontent. To make matters even worse, both Holland and England were now at war with France, leaving d'Entrecasteaux's company "enemies" of the only two European nations present in the region.

The voyage had failed in its primary goal of finding La Pérouse, but the wild search had contributed greatly to the mapping of the southwest Pacific. The formidable cartographic fruits of the voyage were finally published in 1807 as the *Atlas du Voyage de Bruny-Dentrecasteaux,* with 39 charts, including one of the Santa Cruz group with an inset of Vanikoro (Fig. 171).

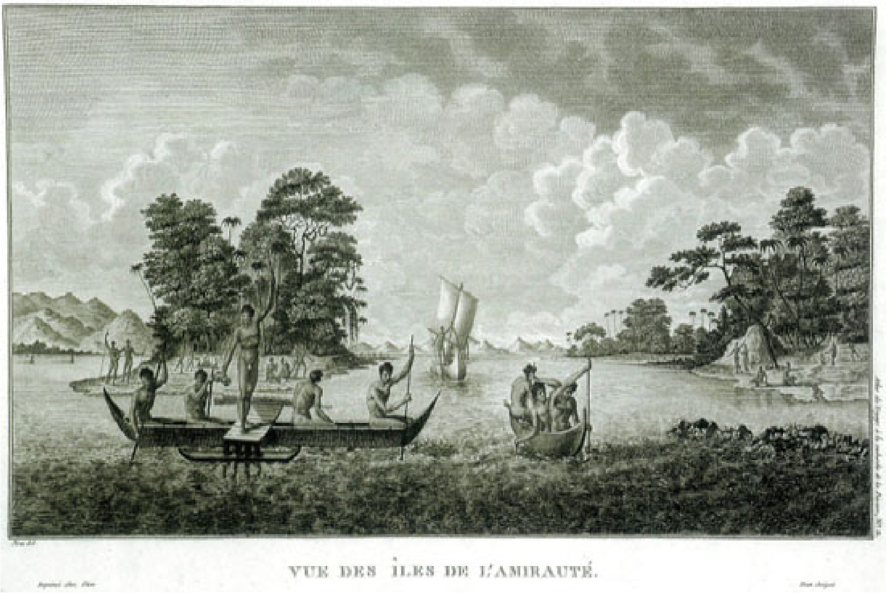

VUE DES ÎLES DE L'AMIRAUTÉ.

Fig. 172. The Admiralty Islands, as seen in 1793 by the d'Entrecasteaux expedition. Drawn by Nicolas Piron. (Paris, 1800). [Antipodean Books, Maps and Prints]

Figs. 169 and 170 are working drafts on which readings were marked and their course plotted, Fig. 170 perhaps being a trial for the printed chart. All three charts depict the same islands: from the upper left to the lower right, they are Tinakula, the small active volcanic island which had provided such a spectacle to Mendana two centuries earlier; Ndeni (Nendo), Quirós's Santa Cruz, largest of the group; Utupua, whose unusual shape made it appear as two islands, and Vanikoro, the island where La Pérouse's wreck, unknown to d'Entrecasteaux, lay. Each chart encompasses about 200 kilometers of ocean, from Tinakula through Vanikoro.

Fig. 169 is the earlier of the two manuscript drafts. It marks only the coasts actually surveyed, so that Vanikoro (protruding tab on the lower right) and the two halves of Utupua are mapped only on their northwest shores. The results of astronomical observations are recorded on the draft, and some calculations are visible in pencil. In the chart in Fig. 170, the unknown southeastern coasts of Utupua (shown as two close islands) and Vanikoro are filled in hypothetically, and part of the tracks of the *Recherche* from May 1793 are marked in red pen. A trial title was prepared on a separate slip of paper and pasted on the map. This title is dated by the Revolutionary calendar, year XIII, which would be 1804-5, two or three years before publication of the printed chart in Fig. 171.

The final, printed product places Vanikoro *(ILe de Recherche,* unnamed on the manuscripts) in an inset for more efficient utilization of space on the sheet. The year of exploration is marked by both the Christian and Revolutionary calendars, while the year of publication, 1807, is by the Christian calendar only.

William Bligh

William Bligh, though best remembered for the *Bounty* mutiny, was a master navigator and surveyor. Some of the fine mapping done on Cook's third voyage was the fruit of Bligh's expertise. But if the mutiny of the *Bounty* crew was his greatest failure, the aftermath was his greatest triumph.

Bligh's command of the *Bounty* to the Pacific, which left England at the end of 1787, was the first to draw upon the recent series of scientific expeditions for a commercial venture. British plantations in the West Indies were in need of a cheap food supply for their laborers; breadfruit, so plentiful in Tahiti, might be transplanted there. The Pacific was approached via Cape Horn, but terrible weather made Bligh eventually about face and head to the Cape of Good Hope instead. Islands discovered en route from New Zealand to Tahiti were named after his ship.

On April 4, 1789, after twenty-three weeks on Tahiti gathering breadfruit, the *Bounty* sailed. "I had little reason to expect making any new discovery," Bligh wrote, "as my Track, altho not traversed by any one before, yet was bordering so near on others, that I scarce thought it probable to meet with any land." But at daylight a week into their voyage, about 1100 kilometers WSW of Papeete, Aitutaki, northernmost of the Cook Islands, was discovered.

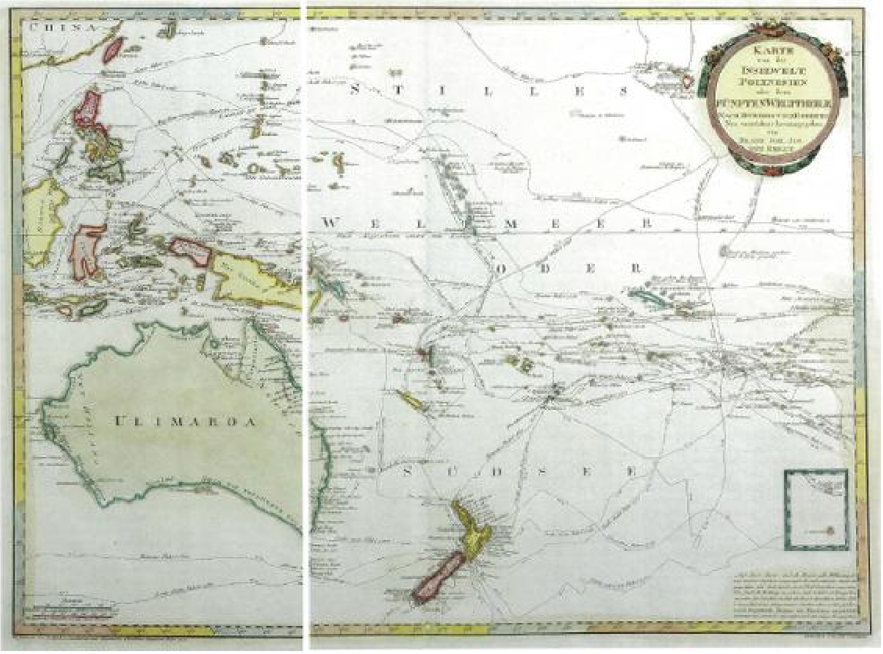
The *Bounty* continued to Niue and northern Tonga before the famous mutiny led by Fletcher Christian. Surveys Bligh had made during the outward voyage were lost in the mutiny, but he continued drawing charts of the isles they passed. Several previously unknown islands were discovered in the Fiji group, among them Viti Levu and the Yasawa group (see Bligh's tracks on Fig. 200), and then new islands in northern Vanuatu: Mota, Saddle, and the

Reef group. Bligh's successful bringing of an overcrowded, ill-equipped launch across 7200 kilometers of open ocean to Timor was an extraordinary feat of seamanship.

The voyage sent to incarcerate Bligh's mutineers, under the uninspired Edward Edwards in the *Pandora,* also discovered one of the Fijis. Sailing west after capturing mutineers who had remained on Tahiti—whom were incarcerated in an onboard cage dubbed "Pandora's Box"—they came across an unknown island with "a vast number of houses amongst the trees." Its mountains "are cultivated to the top; the reason of which, I presume, is from its being so full of inhabitants … we called it Greenville's Island…. The name the natives give it is Rotumah," Rotuma in the far north of the Fijis. Continuing home, Edwards saw smoke rising from an island he called Pitts, which was, in fact, Vanikoro. Had he investigated the island, he might have found the wreck of La Pérouse's ships and two or more living crew. Soon afterwards, the *Pandora* was wrecked on the Great Barrier Reef, the survivors then making for Timor in four boats, in an ironic echo of Bligh's saga. The irony continued in Timor, where authorities in Koepang handed over to them eleven convicts, including two children, who had escaped Port Jackson in a six-oared cutter.

Three years later, Bligh was back in Tahiti for breadfruit. On his return, he revisited the discoveries he had made in the launch, and tried to clarify confusion over the mapping of the Tongan island of Vava'u. He qualified the mapping done by the island's European discoverer, Maurelle. "The relative positions and latitudes agree very nearly" with his own, Bligh found, "and the longitude is out of the question. [Maurelle] has been exact in which it is unpardonable in a navigator to neglect. I mean his latitude." Bligh then sailed through the central part of Fiji, recording twenty-two islands. Ngau was the crew's favorite; they waxed lyrical about the beauty of the island itself and the way its people had cultivated it.

Fig. 173. Map of Oceania by Franz Joh. Jos. von Reilly, 1795, based on a 1780 map of Daniel Djurberg. Djurberg initiated a short-lived trend of designating Australia as "Ulimaroa." The origin of the term lies in Hawkesworth's account of Cook's first voyage. While in New Zealand, Maoris told Cook of visitors who had come in a "small vessel" from a place to the north called Ulimaroa. Although Cook's friend, the Tahitian navigator Tupaia, translated and thought he also knew of the place, the information was ambiguous and Cook "could draw no conclusion." But Djurberg did make a conclusion—and surely a wrong one—taking their homeland to be Australia and the term to be its indigenous name.



With the end of the eighteenth century came the end of the major inventorying of Pacific Islands. The dawn of the next century brought more meticulous mapping of now familiar shores. As if aware of the changing focus, some mapmakers produced encyclopedic compendiums of known islands. General audiences could study the newly rich Pacific on such maps as that illustrated above (Fig. 173), one of several variations of a map by Daniel Djurberg. Academics and pilots needing more detailed and up-to-date data usually turned to a much larger chart by the London cartographer friends as Otto von Kotzebue. The Pacific kept a few surprises for Aaron Arrowsmith. First published in 1798, the map was zealously coming pilots and mapmakers, but most of the remaining work updated as new information became available, including from such would be mapping known shores in greater detail and precision.

Chapter 10

Micronesia, the Elusive Isles

Although the Micronesian islands were among the first shores encountered by Spanish expeditions in the early and mid-sixteenth century, they were the last to be explored and charted. They were also the most difficult to identify with subsequent encounters, owing to their being small islands scattered with no reliable reference points. There is no wide agreement on the identity of most early European landfalls in Micronesia.

Like Polynesians, the peoples of Micronesia effected powerful images of both virtue and wickedness in the minds of Europeans. The Portuguese chronicler Barros endowed them with a Biblical goodness in relating the then recent news that Dioga da Rocha was blown off course during a voyage from Ternate to Celebes in 1525. Reaching an island to which they gave the name of their pilot, Gomez de Sequeira (perhaps Ulithi), Barros noted that "the people of the island are of simple rationality, without any malice, fear, or cautiousness … it seemed to them that they were amidst the simplicity of the First Age."

Two centuries ago, Amasa Delano, a native of Massachusetts and veteran of the American Revolution, wrote in amazement of the Palauans sense of ethics in war: Abba Thulle, the king, explained that "unfair" tactics such as a surprise attack while an adversary slept would never be done, and was disappointed to learn that Europeans considered this acceptable among civilized nations. War, Abba Thulle said, "was horrid enough when pursued in the most open and magnanimous manner," and "regular and open warfare might be the means of a peace without barbarity." Yet, earlier in the same century, Spanish sources deemed the Palauans as so cruel and sinful that the islands were avoided.

The European mapping of Micronesia can be envisioned in three stages. The first, covering the period 1521 through roughly the end of that century, resulted from incidental encounters during trans-Pacific voyages. Most of these discoveries occurred in the course of the early, unsuccessful attempts at an eastward return before the winds facilitating such a crossing were known. Many of the islands sighted during this period would prove to be the most enduring of unidentifiable specks on maps, some remaining in otherwise empty seas into the twentieth century. The haphazard discoveries resulting from the quest for a route east across the Pacific effectively ended in 1565, when Andrés de Urdaneta ascertained a latitude where advantageous winds would be found, most subsequent voyages thus plying similar latitudes.

The second step in the mapping of Micronesia began after a century-long hiatus. It spanned the latter seventeenth through the mid-eighteenth century, during early attempts to establish missions on the islands. Except for the Marianas, almost all of the cartographic information of this period was gathered from indigenous sources. This islander data was circulated and interpreted in various forms through the early nineteenth century.

Only the final stage was of methodical first-hand exploration. This began quite late and inadvertently, in 1783, with a British shipwreck. Although the incident itself changed little in the prevailing map of the region, it had a watershed effect on Europe's interest in the islands. The American Revolution also helped spur exploration of Micronesia because the closing of the United States as a depot for British convicts led to the establishment of New South Wales, and return voyages from the penal colony pierced the Kiribati and the Marshalls. Thus it was not until well after the three voyages of James Cook had demystified Polynesia and Melanesia that serious mapping of Micronesia began, culminating with the detailed surveys of the nineteenth century.

The first printed map to substantively record Micronesia was included in the second edition of the first volume of G. B. Ramusios *Delle Navigationi et Viaggi,* 1554, and attributed to the eminent Italian cosmographer Giacomo Gastaldi (Fig. 174). The Ramusio map, as well as the Ortelius *Maris Pacifici* (Fig. 58) and the map of the western Pacific of Petrus Plancius (Fig. 175), all offer interesting early records of the first wave of Iberian discoveries in Micronesia. They are similar in neither coverage nor sources.

First among the post-Magellan discoveries is seen on the Plancius map, just above the smaller ship in the left center: *I. de S: Ioannes,* island of St. John, probably Sonsorol. When Magellan's *Victoria* sailed west from the Moluccas on its circumnavigation of the globe, Gonzalo Gomez de Espinosa took the expedition's other remaining vessel, the *Trinidad,* north and east in an attempt to return to Panama. Searching for westerly winds, on May 6, 1522 they "made two small islands, which could be in about 5 degrees more or less, to which they gave them the name of the islands of San Juan." San Juan appeared on Portuguese charts before it appeared on the charts of Magellan's sponsor state, Spain, because Espinosa, failing to find the necessary westerly winds for the eastward crossing, returned to the Moluccas, where Portuguese authorities confiscated his maps and log. In about 1575, longitude uncertainty, and perhaps confusion of its name with that of the little Philippines island of Siargao, led the Spanish mapmaker Juan Lopez de Velasco to transpose San Juan to the northeast corner of Mindanao, where it remained into the eighteenth century.

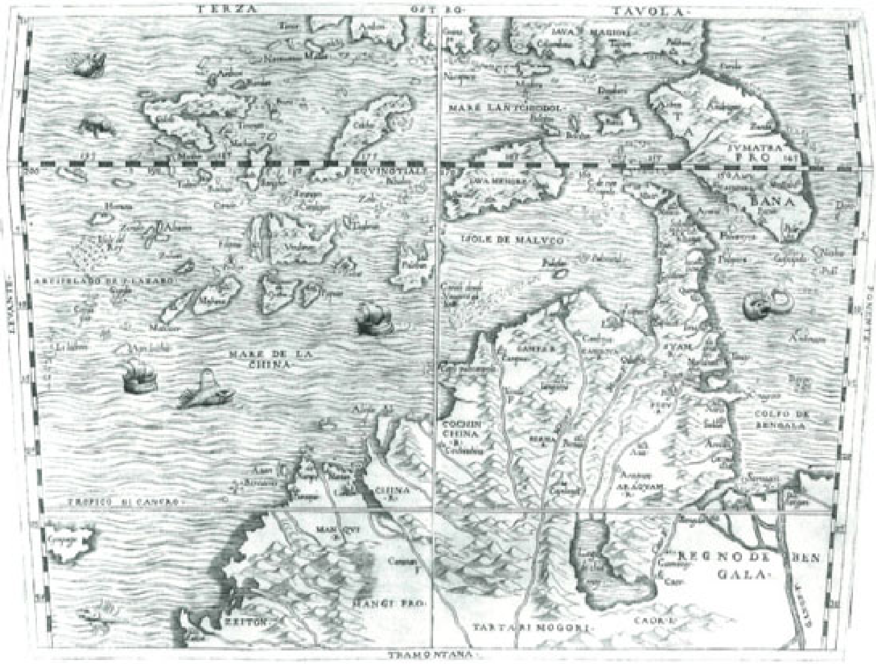

TERZA
TAVOLA
LEVANTE
PONENTE
EQUINOTIALE
ARCIPELAGO DE S. LAZARO
MARE DE LA CHINA
ISOLE DE MALVCO
SVMATRA
TROPICO DI CANCRO
COCHIN CHINA
CHINA
GOLFO DE BENGALA
REGNO DE BENGALA
MANGI PRO
TARTARI MOGORI
TRAMONTANA

Fig. 174. The western Pacific by Giacomo Gastaldi, published in G. B. Ramusio's *Delle Navigations* 1554 (1563). South is at the top, and the heavy horizontal line toward the top is the equator. Straddling and above the equator lie the various islands of Indonesia, from Sumatra on the right through Gilolo (Halmahera) on the left. Below (north of) the equator and to the left (east) of the center vertical line lie the Philippines, in the lower left is Japan (Cympagu), and in the left center, Micronesia.

Near the left border of the Ramusio map are the Marianas *(Li Ladroni),* which were depicted so primitively by Munster in 1540 (Fig. 43), now forming a recognizable north-south chain. Obviously these are no longer based on Magellan, who only made the southernmost of the group. Better sources came quickly: Espinosa had revisited them in the *Trinidad* during his attempted eastward crossing, and while there a cabin boy, Goncalo de Vigo, deserted. De Vigo spent four years in the Marianas, befriending the Chamorros, learning their language, and amassing knowledge about the archipelago. After he was picked up in 1526 by the explorer Garcia de Loaisa, his reports were obtained by the Spanish historian Oviedo, who published them in his *Historia.* De Vigo described the Marianas as a north-south aligned chain of thirteen islands which extends through 21° north latitude—that latitude is about correct for Farallon de Pajaros in the extreme north of the group, if coincidentally so. Ramusio plots the chain with the exact thirteen islands reported, but does not extend them to 21°.

Next we find the fruits of the voyage of Alvaro de Saavedra, whose name in various corrupted forms is even used to denote a Pacific island (an easily recognizable example being the island of *Saia vedra* on the Hondius map in Fig. 61, to the right of the rose compass). In 1527, Saavedra sailed from

Mexico across the Pacific, reaching Guam, Mindanao, Tidore, and Halmahera, then attempted to locate westerly winds, sailing to 14° N, then penetrating to 31°. Early one morning in 1528, "with the sun already up, we saw land when we were about one league from it. This land was baptized by Captain Alvaro de Saavedra the islands of *Los Reyes* [the kings], because on the day we saw them it was the feast of the Kings [the Epiphany]." Hence the genesis of the little archipelago seen on these maps, which represents one of the Caroline Islands, perhaps Ulithi. They are most prominently depicted on the Ramusio map, the *Isole del Rey* on the far left just above middle.

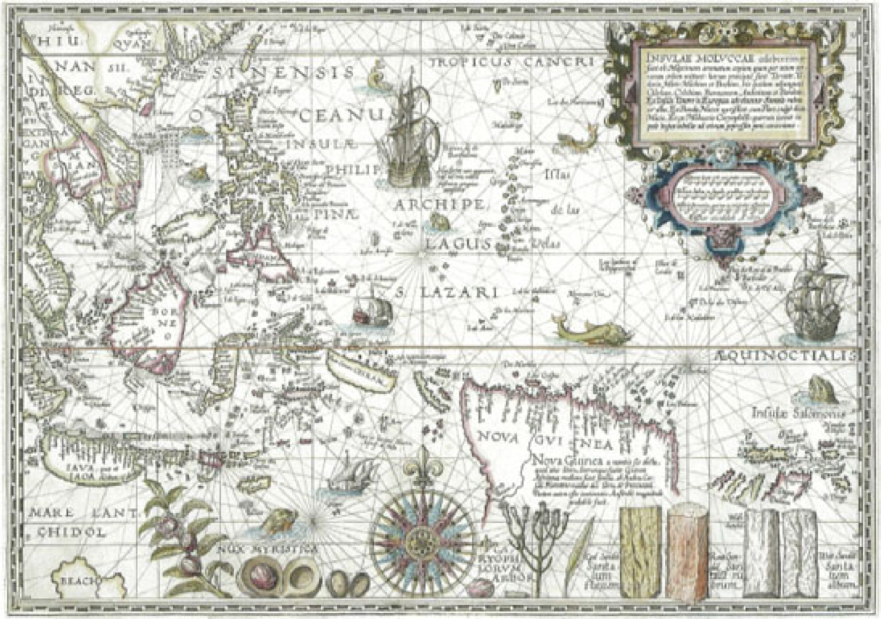


Fig. 175. Culminating sixteenth-century printed maps of the Pacific was this 1594 work of Petrus Plancius, a strong advocate of Dutch strength in the western Pacific and a force in the creation of the Dutch East India Company. Reflecting a common misunderstanding, western New Guinea and the island of Seram are combined as a single island. The map is based on charts by the Portuguese mapmaker Bartolomeu de Lasso which had been smuggled out of Lisbon. J. Visscher, 1617. [Paulus Swaen]

To discover two other islands on these maps, we follow one of Saavedras crew, Antonio Corso, and jump ahead thirteen years, to 1542, when he returned to the Pacific as a pilot under Ruy Lopez de Villalobos. A six-vessel fleet left from the Mexican port of Navidad (visible on the *Maris Pacifici* directly below the Tropic of Cancer), carrying with it charts from Saavedras voyage. Heading west into the Pacific, they discovered *Santo Tome, La Nublada,* and *Roca partida,* which became among the most mapped of Pacific islands. They already appear on Ramusio's 1556 map of America, are prominent on the *Maris Pacifici* (just below Baja California), and are still seen on many maps into the mid-nineteenth century.

The day after Christmas, the feast day of San Esteban, Villalobos discovered a group of islands and in typical fashion named it after the day's saint. However, the islands boasted such beautiful coral (one choice specimen of which was said to have come up with the anchor) that the crew soon forgot the saint and renamed it after the natural wonder. Ramusio, Ortelius, and Plancius all record the island, in different places. Ramusio's is the most prominent; his *Corali isole* is just below the *Isole delRey.*

A week later, Villalobos encountered a group often or more islands which, "as they seemed green and beautiful," Juan Gaytan wrote, "we gave them the name of *li Giardini."*mapped thus by Ramusio *(Giardin*) and Ortelius *(Los Iardinos*). But Plancius adds the disparaging words "al la Desaprovechada" to the term, meaning that these were "garden islands of no merit," the change being adopted by later maps (for example, Hondius, Fig. 67). The Garden Isles are among those cavalierly associated by later geographers with Hawaii, and remained on some maps into the twentieth century, shoved into the anonymity of the northern Pacific waters.

On January 21, 1543, at 10° N latitude, Villalobos "passed by a small island, well populated, which appeared very beautiful." Although small, the island was high, with black rocks, fresh-looking and with beautiful palm trees. "We did not anchor here. Rather, Indians came out with proas making the sign of the Cross with their hands and they were heard to say in Spanish: *'Buenos dias, matalotes',* reason for which we baptized it Matalotes" *(matalote,* in Spanish and Portuguese, denotes a "sailor", in particular one who is rough and unskilled). Augustinian priests aboard wished to name the island after St. Ildefonso, but the crew, struck by the islanders' inexplicably having (supposedly) greeted them in their tongue, dubbed it *Matalotes.* Ramusio took this to be a particularly large island.

Another island with a curious christening lies just above the left galleon on the Ramusio map: *Apri locchio,* literally, "open the eyes." This appears to have been a standard cautionary phrase, as it can be found in different seas on several early charts, though the origin of this particular Micronesian island is not known. Our "open the *eyes'* island soon took on a life of its own when its spelling was corrupted beyond recognition by subsequent mapmakers or engravers. Published maps were particularly influential; Herreras 1601 map of the Pacific, based on the Lopez de Velasco chart of 1575, corrupts it to *abeio,* others in turn parroting the strange name, its origin now invisible to them.

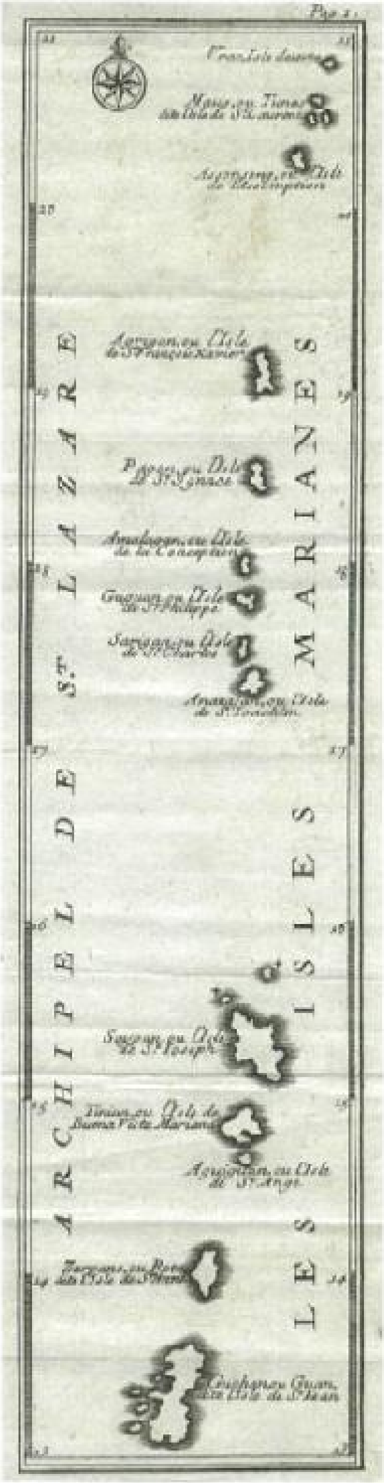
The Plancius identifies an island (directly above the fish above New Guinea) with a similar term, but which cannot be from the same encounter: *Miracomo Vaz (mira como vas,* meaning "watch where you're going"). This comes from the Legazpi expedition's discovery of reefs near Chuuk in the Carolines in 1565: "At daybreak, we tacked back to see if we could see the reef, or island, but we could not… it is in 8 degrees. The pilot baptized it *Mira como vas* because that is what those passing here should do." Arellano entered within the reef, and was invited by the islanders to enter an inlet by an island called Tonowas, but problematic winds and fear of the islanders kept them away.

Bernardo de la Torre, a member of Villalobos's expedition, added four long-lived archipelagos to the Pacific map while attempting to find an eastward route across the Pacific in 1543. "They had sight of certain islands," the English chronicler Hakluyt related of September 25, "which they named Malabrigos (that is to say, The Evil Roads). Beyond them they discovered Las dos Hermanas (that is, The Two Sisters). And beyond them also they saw 4 islands more, which they called Los Volcanes." On October 2, they "had sight of Farfana, beyond which there stands a high pointed rock, which casts out fire at 5 places." "Farfana" is from the Spanish Huerfana (orphan). As with most early Micronesian discoveries, these are found in various places and spellings; the disparity is seen on the Ortelius and Plancius maps.

Before "islands of thieves," Magellan had originally dubbed the Marianas *Islas de las Velas Latinas,* "islands of the Lateen Sails," in honor of the Chamorros's lateen (triangular) sailed canoes. Plancius uses this earlier designation, omitting, as became common, "lateen." Midway between the fish above New Guinea, and the right ship, lies *De los dos Vesinos* ("of the two neighbors, or residents") discovered by Arellano of the Legazpi voyage in 1565. There they found no people "except two who were fishermen who had come from outside to fish at those islands." Next, Arellano discovered "Island of the swimmers" *(I: de los Nadadores,* just below *dos Vesinos*) "because [the people of the island] came aboard by swimming when we were over one league from the island … they would make the best possible rowers for a galley, according to the tall and well-built bodies they had." To the north on Plancius's map is *I: de Paxaros,* the "island of birds," which "was so small," according to' Legazpi's pilot Esteban Rodriguez, "that we think it was uninhabited … the whole island was full of birds and for this reason we named it Isla de Pajaros."

Fig. 176. The Mariana Islands from Ie Gobien, *Histoire des Isles Marianes,* 1700. "Before the Spaniards appeared in these islands," the volume relates, "the inhabitants lived in complete freedom. They had no laws except those that each individual imposed upon himself. Separated from all nations by the vast seas that surround them, and enclosed in their islands, as in a small world, they completely ignored the fact that there were other lands, and they considered themselves to the only men in the universe." Pigafetta had made the same comment about the Chamorros when he reached the Marianas on the Magellan voyage in 1521.

Le Gobien claimed that the Chamarros often live to be 100 years of age, "yet they were so strong and healthy that they seemed to be fifty." He wrote at length about the matriarchal nature of their society, describing the abuses that husbands often endure at the hands of angry wives and their families. "This dominion of women over men," he observed, has caused many young men not to marry, but instead to "hire girls, or buy them from their parents for some bits of iron or tortoise shells," living with them "in public houses." Fire, he claimed, had been barely known to the Chamarros before Magellan used it to destroy a village, and at first "they regarded fire as some species of animal which attached itself to wood in order to nourish itself." For all the faults of Chamorro society cited by Ie Gobien, theft, the attribute for which the islands had been best known to Europeans, was not one. "These islanders have horror of homicide and theft. Thus one does them an injustice in calling their land *las islas de los ladrones.* Far from being robbers, they trust one another, and never close their homes. They leave them open always, without anyone robbing his neighbor." [Helen Kahn]


ARCHIPEL DE Sᵀ. LAZARE
LES ISLES MARIANES
Assonsong ou l'Isle de l'Assomption
Agrigan ou l'Isle de Sᵗ François Xavier
Pagon ou l'Isle de Sᵗ Ignace
Anatajan ou l'Isle de Sᵗ Ioachim
Saypan ou l'Isle de Sᵗ Ioseph
Tinian ou l'Isle de Buena Vista Mariana
Aguigan ou l'Isle de Sᵗ Ange
Guahan ou Guam dite l'Isle de Sᵗ Iean
14
15
16
17
18
19
20

Another island Plancius records after Legazpi is *Barbudos* (just east of

Paxaros), one of the Marshall Islands. "There were about 100 Indians at this island," the pilot Esteban Rodriguez explained in his log book, "comely with beards; for this reason, we named this island Los Barbudos ["the Bearded Ones"]. It is in 10 degrees and ¼," though Plancius places it further south.

Ironically, whereas these ambiguous discoveries were widely mapped, an important, identifiable discovery made at the end of the century was not: Pohnpei. It was almost certainly this largest member of the eastern Carolines that Pedro Fernandez de Quiros discovered in the course of his desperate flight to Manila on Mendanas second expedition, after having failed to locate the Solomons. On December 23, 1595, in six degrees north latitude, "they got sight of an island, towards which they steered, intending to seek there a port and provisions." The island was inhabited, "almost round," and was so well protected by rocks and reefs that they were unable to land despite their dying crew and ship, though they almost ran aground. This description, along with their observation that "at three leagues to the west, they saw four low islands, and many others close to it, all surrounded with reefs," safely clinches the identity of this island as Pohnpei, which was later given the name "Quirosa" or just labeled as the island discovered by Quiros. Pohnpei can be found as an ambiguous speck on official Spanish charts, such as those by Teixeira in Fig. 66 (extreme upper left) and 75 (above the word "Equinocial"), but the important discovery had no influence on published maps.

European knowledge of Micronesia then effectively stagnated for more than a century. Even into the early 1700s, the data accumulated during this earliest phase remained the complete Micronesian repertoire of many geographers.

Missionaries Question Islanders to Construct Maps

The next epic in the cartography of Micronesia was that of missionaries in search of pagan souls, and except for the Marianas, that data was principally Pacific Islander data, reconstructed by Jesuits into the Europeans' map "language."

Some scattered such reports were collected during the early years of the seventeenth century. For example, when Fray Juan Pobre, in Rota in 1602, asked a fellow Spaniard about the islands, he was told that "there are many such islands. Besides those shown on the navigation chart which are only the seven or eight… there are many more in the direction of the Volcano [Island], so that according to what I have been informed by these Indians there are over twenty islands," whose people all speak the same language. But not until a century later did any such transmission affect the published cartographic record. The "Volcano Island" normally denoted Asuncion (third place name from the top on Fig. 176), though at the time of conquest, the Chamorros referred to all the islands north of Saipan as the "volcano" *(gani)* islands.

In 1662, the Jesuit Diego Luis de Sanvftores visited Guam on his way to Manila and became infected with a desire to bring Christianity to the

Chamorros. Unsuccessful in his attempts to establish a mission in the archipelago through his superiors in Manila, his case was taken to Madrid, Rome, and ultimately conveyed to King Philip IV and Mariana of Austria. In 1667, he was granted permission and funds for a mission in the *Ladrones*. When Philip died three months later, and Mariana became queen-regent, Sanvftores proposed renaming the archipelago after her, and thus they are today known as the Marianas.

Maps of the archipelago (Fig. 176) and of Guam (Fig. 177) were made in 1671 by Father Alonso Lopez, a local missionary, and published in 1700 by Father Charles Ie Gobien. "In order to know the size and location of these islands," Ie Gobien wrote, "one should not refer to maps, for the names and exact locations have been learned only in the past few years." Although his *Archipelde St. Lazare was* certainly the best published rendering of the Marianas to date, he seems to have worked from separate originals for each island without sufficient data as to orientation or distance. He achieves the general shapes of the islands with reasonable success but many are oriented wrongly, such as Rota, which he aligns N-S rather than NE-SW, and Saipan, which is reversed, NW-SE instead of the correct NE-SW. Although he knew that certain islands formed close groupings—such as Saipan, Tinian, and Aguijan— distances between islands are generally poor, even among those better known. For example, Rota is too far south and Guam too far north, roughly halving the true distance between them.

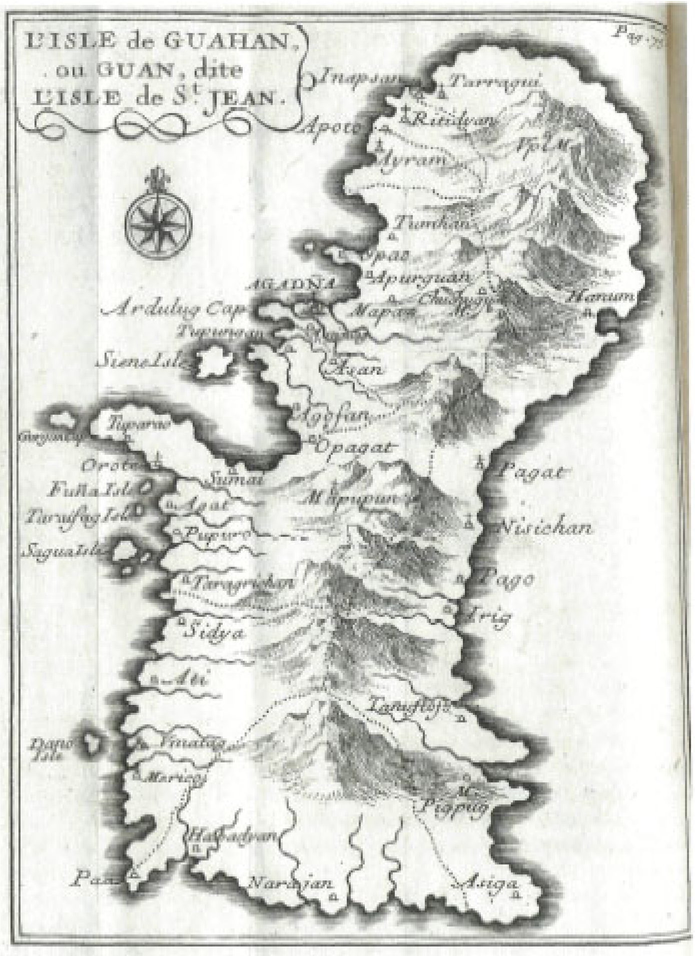

L'ISLE de GUAHAN, ou GUAN, dite L'ISLE de St. JEAN.
Pag. 7
Inapsan
Tarragui
Ritidyan
Apoto
Upi
Ayram
Tumhan
Opas
Apurguan
AGADNA
Chuchugo
Hanum
Ardulug Cap
Mapan
Tupungan
Siene Isle
Asan
Agofan
Tuparao
Opagat
Pagat
Orote
Sumai
Fuña Isle
Agat
Mapupun
Taruifag Isle
Nisichan
Pupuro
Sagua Isle
Pago
Taragrichan
Irig
Sidya
Ati
Tarufofo
Dano Isle
Umatag
Marieo
Pigpug
Habadyan
Pa
Naraijan
Asiga

Fig. 177. Guam, from Ie Gobien, 1700. [Helen Kahn]

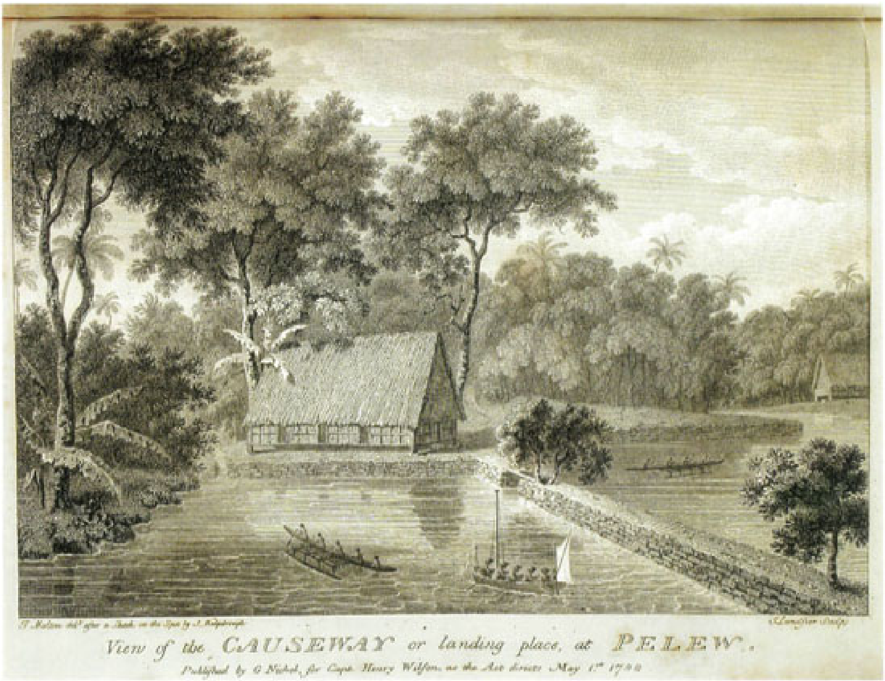

View of the CAUSEWAY or landing place, at PELEW.
Published by G Nichol, for Capt. Henry Wilson, as the Act directs May 1st 1788

Fig. 178. Village in Palau, from George Keate's 1788 account of the voyage and shipwreck of Henry Wilson's *Antelope.* [Antipodean Books, Maps & Prints]

Until the nineteenth century, the mapping of the Marianas was mostly the work of Spanish mariners, though other Europeans occasionally visited the islands. George Robertson of Wallis's expedition, for example, tried to observe the moons of Jupiter to fix the longitude of Tinian while anchored there in 1767, but the planet's proximity to the sun at that time foiled the effort.

The northern Marianas remained poorly charted for many years. When the Massachusetts captain, Amasa Delano, passed Pagan (500 kilometers north of Guam) and neighboring islands in 1802, he had "a good set of sights on each side of the moon" to fix longitude. Yet he could not identify them, "as these islands are laid down very erroneously in the best charts that we have."

In December 1696, castaways from Fais, in the Carolines, were driven onto the Philippine island of Samar, into the care of Spanish missionaries. Two women who had previously been beached on the Philippines were able to serve as interpreters, and when a Father Paul Klein visited Samar shortly afterwards, he met with these "twenty nine *Palaos,* or inhabitants of certain new-discover'd Islands." Upon questioning them, the Jesuits learned that they had sailed for "one of the Neighboring Islands; when there arose a very strong Wind, that forced them out into the main Sea, so that they could not gain the island they design'd for … they were driven before the wind for seventy days [until] they resolved to give themselves up to the Mercy of the Winds," which soon brought them to Samar. "They relate that their country consists of two and thirty Islands; which cannot be far distant from the *Marianas,* as may be judged by the Make and Smallness of their Vessels, and Form of their Sails, which are very like those of the *Marianas."*

The missionaries deduced that their islands must lie eleven or twelve degrees north latitude, "under the same degree latitude as *Guivam* [Guiuan, southern Samar, Philippines]; for sailing directly from East to West, they came ashore at this town." The Carolinians tried to explain the names and locations of their islands to the Spanish on Samar, and in 1696 the result of this exchange was published by Father Klein. The map, which referred to the islands as the "new Philippines," appeared in Spanish in 1696, French in 1705 (Fig. 179) and later copies by the publisher Bellin, and English in the *Philosophical Transactions* of 1721. The latter explained that " [This] map was not made by Europeans, for none have yet been upon these islands, but by the islanders themselves, after this manner. Some of the most skilful of them arranged upon a table as many little stones as there are islands belonging to their country; and marked out, as well as they could, the name of each, its extent and distance from the others: And this is the map, thus traced out by the Indians, that is here engraved."

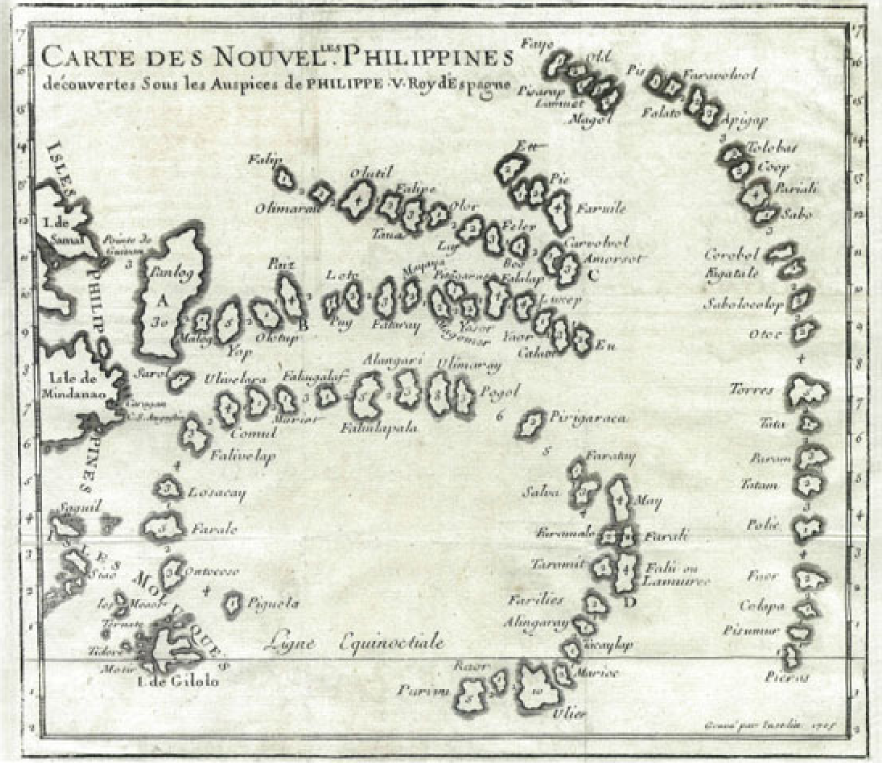

CARTE DES NOUVELLES PHILIPPINES
découvertes Sous les Auspices de PHILIPPE V. Roy d'Espagne
ISLES PHILIPPINES
I. de Samal
Pointe de Guiuam
Isle de Mindanao
Pantog
A
B
C
D
Faye
Pis
Falato
Apigap
Magol
En
Pie
Falip
Olatil
Olimarau
Falipe
Olor
Tana
Feler
Lug
Bos
Falalap
Amorsot
Luwep
Corobel
Saboloolop
Otoc
Torres
Tata
Parum
Totam
Polie
Faor
Colapa
Pizumur
Pieras
Paiz
Lato
Poy
Falaway
Yaror
Yaor
Calam
Malog
Yap
Olotup
Sarol
Ulivelaga
Falugalaf
Alangari
Ulimaray
Pogol
Marier
Comul
Falalupala
Falivelap
Piriyaraca
Faratay
Salva
May
Farala
Farail
Tarumit
Fali ou Lamuree
Farilies
Alangaray
Marier
Raor
Parimu
Ulier
Losacay
Farale
Ontocoso
Piquela
ISLES MOLUQUES
Sagail
Siao
Ternate
Tidore
Motir
I. de Gilolo
Ligne Equinoctiale
Gravé par Inselin 1705

Fig. 179. Caroline Islands, Father Paul Klein, 1696 (1705). Constructed from the reports of Carolinians whose vessel was washed ashore in the Philippines.

The *Philosophical Transactions* explained that the numbers placed in, and between, islands are travel times as related by the islanders: "The figure in the midst of every island, shows how many days sail it is in circumference. The figure between each island, shows how many days are required to pass from one to the other."

Thus, the number within each island indicates the island's size measured in the number of days it takes to circumnavigate, and the number between islands indicates the distance between islands, likewise recorded in units of sea-borne days. The principal island was said to be *Lamurrec,* "It is there that the King of the Country keeps his Court." The map covers the area from *Panlog (Palau*) and Yap on the west, through Chuuk on the east, one of the Chuuk islands being represented by the island marked *Torres.* Adding to the difficulty in constructing the map was the fact that many of the islands mentioned by the Carolinians were islets within atolls, while Klein mapped each as an independent island.

Klein's letter of June 1697 explained the source of map: "The Geographic Map of these Islands showed 87 of them, with various sizes, that were described by the above-mentioned Indians, who pointed them out with their names as shown on said Map. And, to explain the differences in the relative size of the islands they used stones, some small and some bigger, placed upon the ground, in accordance with the position which they conceived said islands to occupy in the sea. Although it is a fact that, before a rigorous examination of the knowledge they have of the Islands was tested, they had only named 32, however, after they had a chance to review their memory they named and pointed out as many as 87 islands, and they testified to have been, and seen all said Islands. And they added that there existed many more Islands, but that since they had not visited them, they did not retain them."

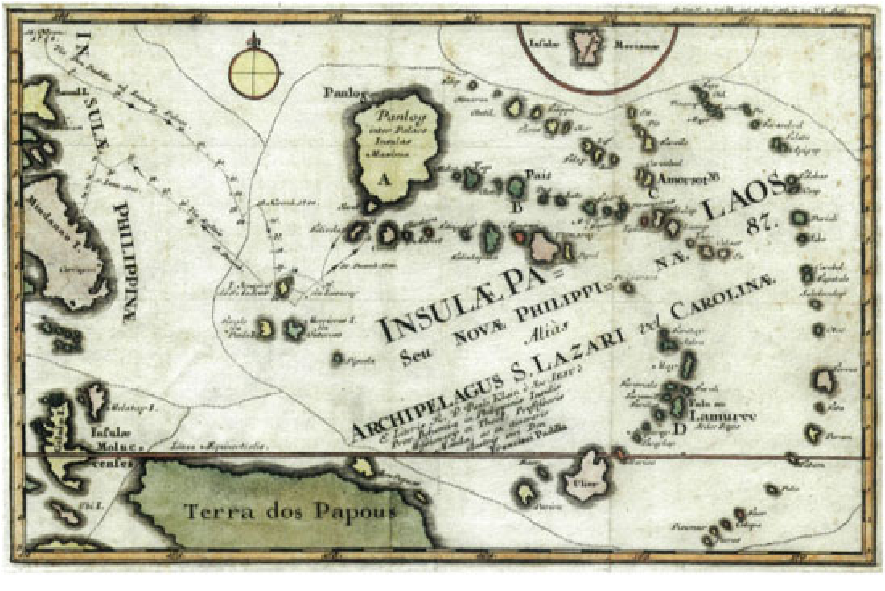


Fig. 180. The Caroline Islands, Joseph Stocklein, 1726. Stocklein tried to interpret more accurately the indigenous data of the Klein map (Fig. 179).

Thus, a vessel leaving from the eastern tip of Samar (Philippines), where the islanders were questioned, would sail for three days to reach Palau (island A, *Panlog),* and to circumnavigate Palau would take thirty days. "The Island that is marked with the letter B *(Paiz,* probably Fais), Klein explains, "is the home island of these Indians. The Island from which they departed, when they got lost, and were pushed off by the wind, when they tried to return home, is marked with the letter C *[Amorsot,* probably Lamotrek]. The Island where the King lives [marked with the letter D] has two names, and those are: Falu or Lamurec." *Falu* (or "Palu," the "f" and "p" being interchangeable) was probably a misunderstanding, as it means "navigator" in the Carolinian language.

Maps served as tangible evidence of pagan souls and benefited the Jesuits' goal of patronage for missions. The Supreme Pontiff, Clement XI, was brought "a beautiful Map, with a description of the new Islands recently named, and many more that afterwards the Indians from there added after more interrogation…. Picking up the Map, or Geographic Chart, with his own hands, he asked various questions, suggested by his own holy zeal, which in substance were about their location, size, number, and condition of their inhabitants, vicinity with the Philippines."

Jesuits' conversion of the islanders' time-based distance into European linear distance was subject to wide interpretation. A map in Father Joseph Stocklein's *Der Neue Welt-Bott (1726,* Fig. 180) depicts essentially the same information as the Klein map, but adjusted for east-west breadth and island size to better reflect the islanders' figures. For example, the Klein map marks "1 " inside *Olotup* (Ulithi, immediately east of Yap), meaning that the island's circumference is a one-day sail, yet it is virtually the same size as Yap, which is marked as a five-day circumference. Stocklein inserts northwestern New Guinea (*Terra dos Papous),* which was lacking on the Klein map, and records the tracks of Francisco Padilla, the would-be first military governor of the Carolines, on his voyage of late 1710 through early 1711.

Juan Antonio Cantova was in Guam in 1721 when two wayward canoes from the Caroline Islands reached its shores. Hoping to remedy the Church's failure at proselytizing in those mysterious islands, he constructed a map (Fig. 181) based on whatever he could glean from the canoe's navigators. The map, which introduces his appellation "Carolines," extends from Palau and Yap on the west through Chuuk on the east. Most easily recognized is Yap, the upper left circle, and Palau, the lower left circle. Continuing to the east is Ulithi, the archipelago named *Egoi* and marked by the large ellipse. *Lamürrec-Ulee,* in the large circle just right of center, encompasses the various islands of the Lamotrek-Woleai region. The islands of Chuuk, contained within the large *I. Provinz Narnens Cittac,* is the easternmost archipelago marked. These reconstructions of indigenous geographic data remained the best that was known of the Carolines for many years.

While Spanish missionaries eyed western Micronesia, the islands were being flaunted about on other stages. In 1775, a sultan on the southernmost Philippine island of Mindanao offered King George III territory on "any Island wherever they may choose to settle in my Country," believing that the English wanted only to trade, and would provide protection from the proselytizing Spanish and the meddlesome Dutch. But by "his" country he included "Yap; Islands not yet properly discovered and known. I will give any of those Islands to the [East India] Company."

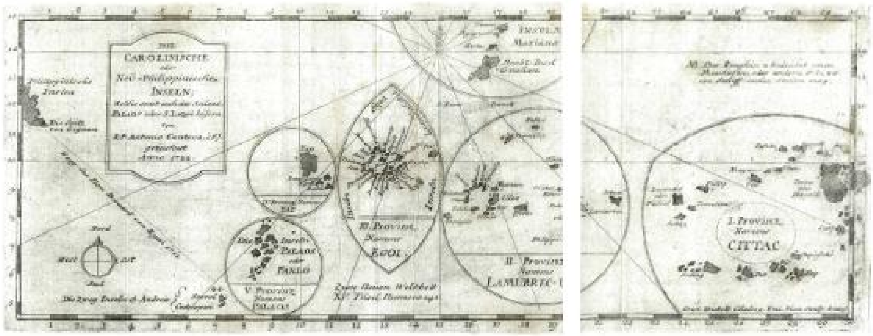
The Methodical Mapping of Micronesia

The "modern" mapping of the islands begins not with a planned voyage of exploration or proselytizing, but rather with a shipwreck at Palau during an otherwise routine commercial trip. On July 20, 1783, in the port of Macao, the vessel *Antelope* weighed anchor under Captain Henry Wilson. Their voyage was from the beginning disoriented by high seas and heavy rains. On August 1, their latitude was determined to be 16° 25' N, and the following day longitude, measured "by the distance of the sun and moon," was set at 126½ degrees east of Greenwich—they were in the seas east of Luzon. Terrible weather beset the ship for another week, with the loss of her livestock. But on the night of August 10, only a day after calm returned, a violent thunderstorm hit and the *Antelope* struck a reef near Ulong, one of several small islands running SSW from the main island of Babeldaob. The crew sat out the black night on the crippled vessel, their hopes pinned on two sailors' belief that "in the momentary interval of a dreadful flash of lightening," they had seen "the appearance of land ahead of the ship." The light of dawn confirmed that they lay three or four leagues from one small island, with three of four more visible.

Crew and salvaged supplies were ferried to the nearest island, which was uninhabited. When native canoes came to investigate the strangers' presence, among them was a Malay sailor, himself shipwrecked about ten months earlier. As one of the *Antelopes* crew spoke Malay, and the Malay sailor also spoke some English and Dutch, in addition to having learned the Palauan language, communication with the islanders was established.

Over the next three months, King Ibedul graciously accommodated his guests as they built a new vessel with which to return to China. Since cartographic iconography overlaps with literal imagery, it is interesting to relate the reaction of some of the islanders to a crew member's drawing. Amidst being entertained by the king, the man, "being struck with the appearance of a woman who was present, took out a piece of paper, and was making a sketch of her figure." The woman sought to leave, but the king was so enamored of the unfinished sketch that he "immediately sent a messenger to order two of his women to come to the house" who "placed themselves at the window" where the artist was situated, from which "these ladies could stand without being seen lower than the waist," Once the sketch was completed and was presented to the king, he showed it to the two women, "who seemed pleased in viewing on paper a fancied likeness of themselves."

Fig. 181. Father Cantova's map of the Caroline Islands, 1722, as engraved for *Allerhand so lehr-als gesit-reich Brief,* 1728.



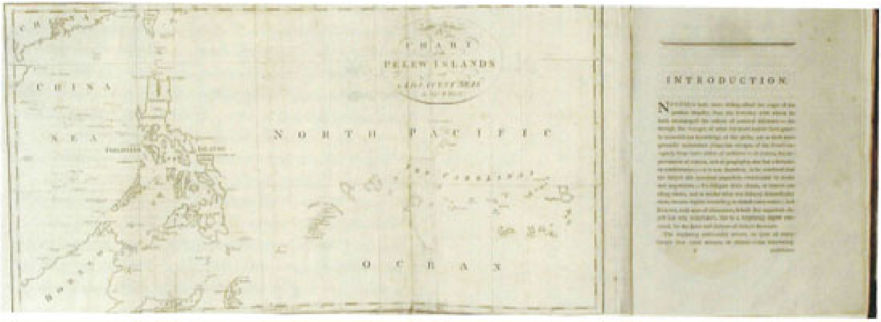


Fig. 182. The Caroline and Philippine islands, Henry Wilson, 1788. [Antipodean Books, Maps & Prints]

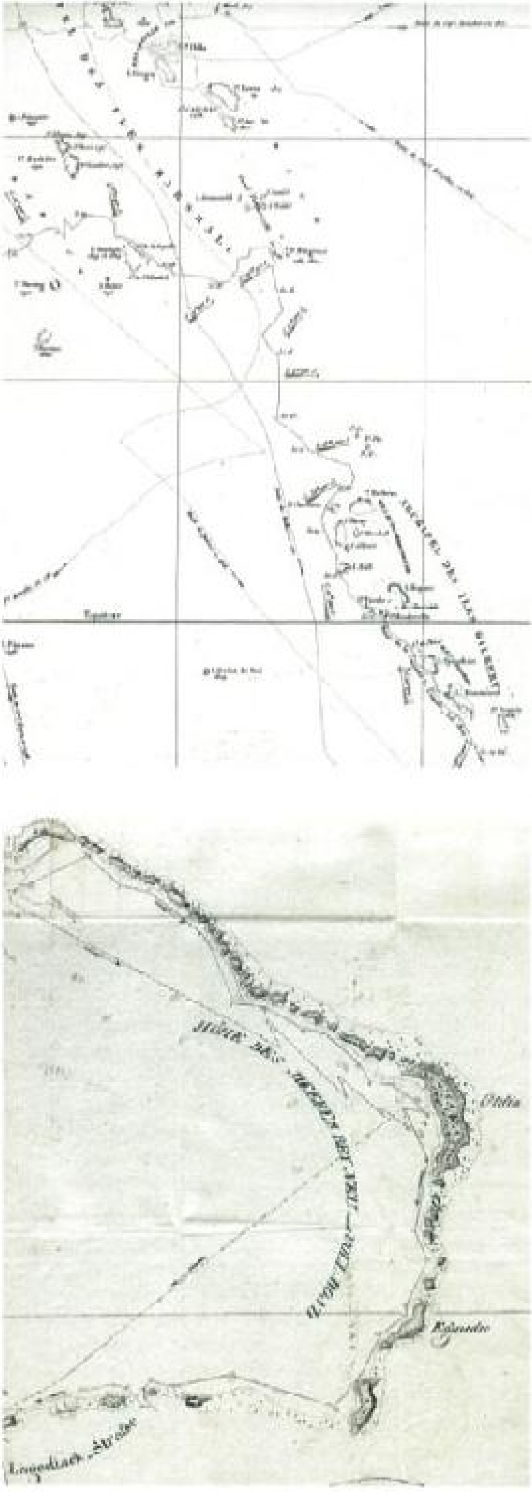
The town of "Pelew" lay about a quarter mile inland. After ascending a bank and traversing a wood, the English were led over "a fine broad causeway … with rows of trees on each side … raised about two feet above the level of the ground, and was about ten feet in width, having a broad flat stone running along the middle, for the greater conveniency of walking," smaller stones lining the perimeter. Wilson and his shipwrecked crew were brought to a house on a large central square, where a large number of people had congregated "to see these new Beings the English."

The account of the voyage by George Keate, along with Wilsons map of Micronesia, was published in 1788 (Figs. 178 and 182). "The little cluster of islands I am now unveiling to the world," the author waxed, "may truly be regarded as a rich jewel, sparkling on the bosom of the ocean." The volume's straightforward account of the selflessness and kindness of the islands' people directly contested the image of "savage, inhuman" people "feeding upon human flesh" given by Father Cantova in 1722 based on what he claims to have been told by other Caroline Islanders. Not only did Wilson's account exalt the humanity of the Palauans, but it was observed that class distinctions were absent. The king of the islands not only wore no clothing, but indeed had not even "any ornament of distinction"—these words published in Keate's popular book one year before the French Revolution.

The volume's map does nothing to flatter the voyage as one of exploration. But as the account explains, "the Antelope was not a ship particularly sent out to explore undiscovered regions or prepared to investigate the manner of mankind; it had not on board philosophers, botanists, draughtsmen, or gentlemen experienced in such scientific pursuits." The map is merely a variation of the Cantova map of 1722. Wilson, whose primary concern was to leave as quickly as possible, failed even to learn that Palau had one major island that in size dwarfed all the others in the archipelago.

Wilson reflects a common ignorance of the considerable effort made by the Spanish to map the Carolines. Spanish missionaries, he wrote, "unquestionably well informed of the poverty and nakedness" of the Micronesians, "apprehended that they were never likely to become an worthy object of the Spanish monarchy," and were therefore neglected, little being known about them other than that "they occupy a certain space on the surface of the globe".

At the same time that Wilson's book was published, there also began a flurry of major discoveries in other parts of Micronesia as an indirect result of the American Revolution. In the years leading up to the Revolution, England was shipping about a thousand convicts a year to her American colonies. Once independence foiled that outlet for prisoners, New South Wales was selected as a substitute. When British vessels began the return trip after unloading convicts in eastern Australia, they typically sailed north into Micronesian seas before turning west to China.



Above. Fig. 183. Kiribati (detail of general chart), Louis Duperrey, 1827. [Kauai Fine Arts]

Below-. Fig. 184. A detail from Kotzebue's map of Wotje, the first published large-scale map of an individual Marshallese group. The easternmost islet, "Odtia," is Wotje, principal of the archipelago's 72 islets. Vienna, 1825.

These discoveries began when the "First Fleet" was sent from England with *776* convicts. Captains Thomas Gilbert and John (sometimes "William") Marshall of the vessels *Charlotte and Scarborough* were en route to China on the voyage home when on June 18, 1788 three atolls were sighted. Many canoes were seen on the beach, and many others were already heading toward them in the water. The English were impressed by the lateen sail canoes, which "tacked in a very expeditious manner, by shifting its lateen sail (by which means the head becomes the stern), and went off at a great rate." Marshall named the islands after his colleague Gilbert, by which name they are still known in addition to the official "Kiribati," which curiously is not an indigenous term, but rather a Gilbertese pronunciation of "Gilbert."

Continuing north, after five days a new group was encountered which Gilbert reciprocally named the Marshall Islands. They had discovered the Radak (eastern) chain of the group. Marshall and Gilbert assigned names to the individual isles they encountered; although these have been replaced by their indigenous names, Marshall's name still denotes the archipelago itself.

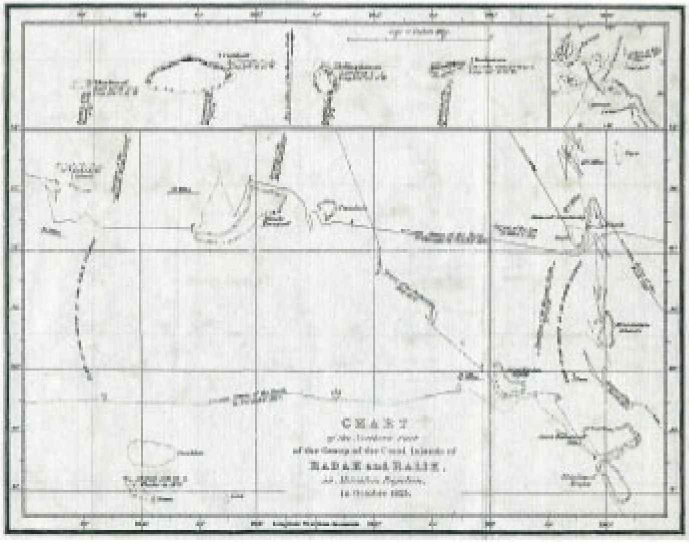
Several voyages added pieces to the puzzle. The first two modern rediscoveries in the western, Ralik chain of the Marshalls occurred in mid-December 1792, when another vessel returning from New South Wales, the *Royal Admiral* under Essex Henry Bond, sighted the Namorik Atoll pair. The southern Gilberts (Fig. 183) were "discovered" again in 1799 by the British trader Charles Bishop after bringing a group of missionaries to Sydney, and who had not learned of Gilbert and Marshall's discoveries. Bishop named some of the Gilberts the Kingsmill Islands, by which name they are sometimes found in the nineteenth century (for example, Bennett, Fig. 207).

Nauru was discovered in 1798 by John Fearn, captain of a "snow," a two-masted trading vessel, while en route from New Zealand to Calcutta. Fearn "fell in with two strange islands, and a very extensive range of shoals, which, not appearing on any chart extant, are presumed to be discoveries." The longitude of Nauru was read at 167° 18', about 40 kilometers too far east—Fearn acknowledges his figures would be rough. The "solitary spot was found extremely populous, although the nearest known land is placed by the charts above six equatorial degrees distant." The Nauruans were courteous and without weapons; he dubbed it Pleasant. In modern times, the mining of this coral atoll's rich phosphate deposits brought the Nauruans substantial income, but as a result most of what Fearn had described as this "beautiful little island" is now uninhabitable. Fearn also charted Eniwetok.

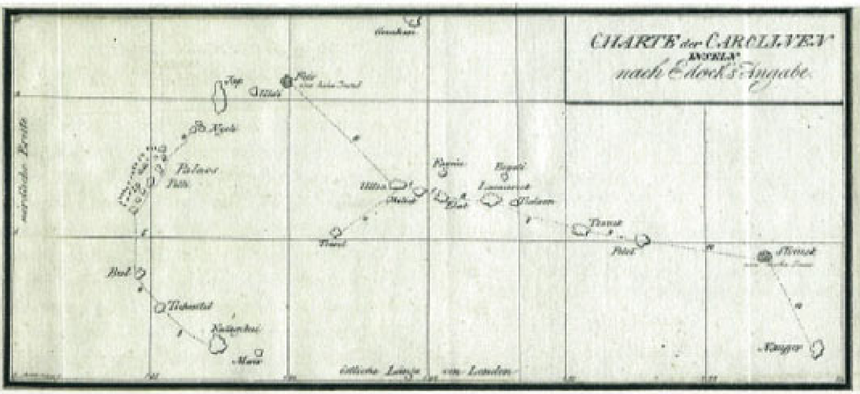
Captain Mertho in the *Ocean,* sailing from Sydney to China, placed new Marshallese islands on the map, though which if any were altogether new discoveries is unsure. An island he christened after his ship is probably Banaba, and is marked by Duperrey (Fig. 183). Another he named Catherine is probably Kwajalein, and is recorded on many later maps, such as Tallis (Fig. 10).

Otto von Kotzebue was particularly fond of the Marshall Islands, and on both his Pacific voyages seemed to come "home" to them, the way Cook would come "home" to Tahiti. He first reached the Marshalls in May 1816, en route from the Tuamotus to Kamchatka. Along the way he "discovered" Utirik and Taka, not realizing that Gilbert and Marshall had already placed these atolls on the map as the Button Islands, but further investigation of the Marshalls was not possible at that time because of his need to reach the Arctic during the summer.

After piercing the Bering Strait, sailing along the American coast to San Francisco, and visiting Hawaii, Kotzebue continued west back to the Marshalls, finding a new island on New Year's Day 1817, naming it for the occasion: this is Mejit, which typically appeared as *Miadi.* Sailing southwest from Mejit, Kotzebue discovered an atoll group which he named Romanzov after the expedition's patron. They pierced the vast lagoon on the southeast through an opening still known as the Rurik Pass, naming the lagoon Christmas Harbor, as they celebrated the holiday there on January 6, the traditional date. After a cursory perusal of the various islands by boat, Otdia (Wotje, Fig. 184) was selected as the best anchorage for the Rurik. Three weeks were spent surveying the group, which spans roughly 50 kilometers and in which they counted 65 islets (there are 72 in all).



Above: Fig. 185. *Chart of the Northern Part of the Group of Coral Islands of Radak andRalik, in October 1825.* Published in London in 1830 with the English account of Kotzebue's voyage, this map records his tracks through the northern Marshalls from both expeditions. London, 1830. *Center:* Fig. 186. Kotzebue's map of the Carolines, from his first Pacific voyage. Vienna, 1825. *Below:* Fig.187. The Caroline Islands according to Luis de Torres. Kotzebue, Vienna, 1825.


CHARTE der CAROLINEN
INSELN
nach Edock's Angabe
nördliche Breite
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Yap
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Pelli
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Tucor
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Mere
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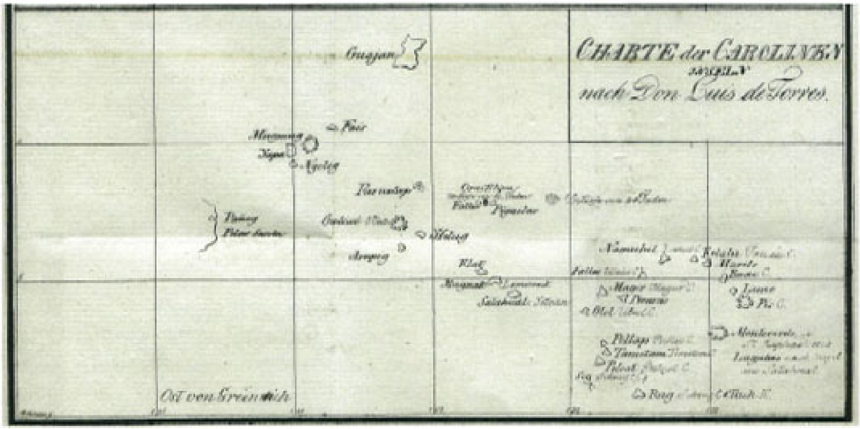
CHARTE der CAROLINEN
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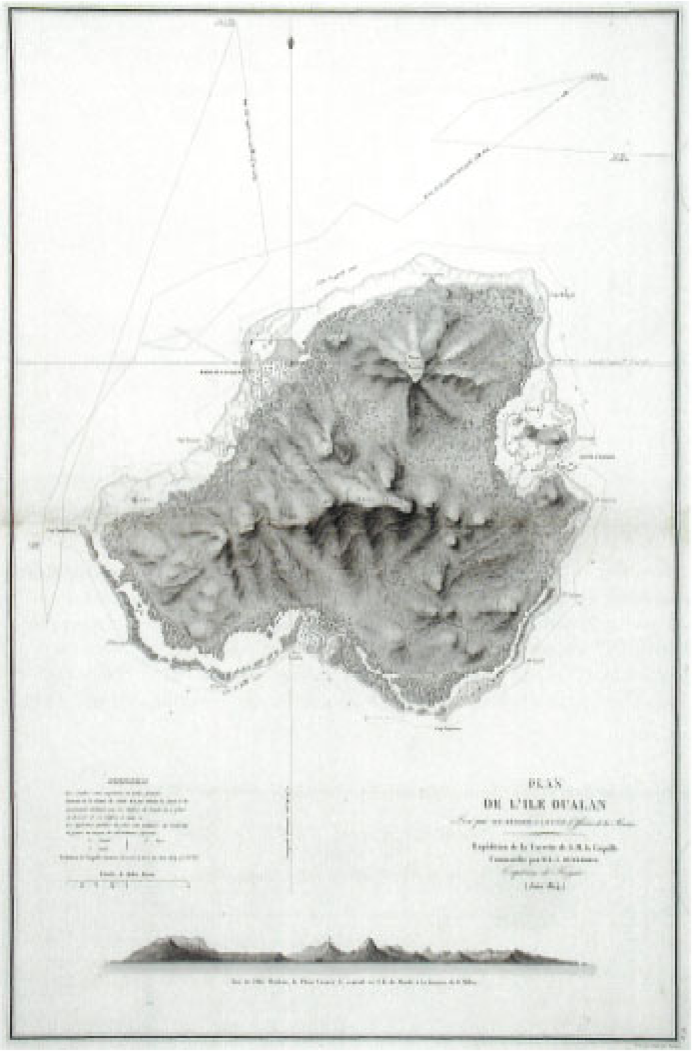


Fig. 188. Kosrae is said by Duperrey to have been first sighted by a Bostonian named "Crozer," perhaps an error for "Crocker," in 1804. Duperrey stayed in Kosrae (his *Oualan*) for ten days making the first survey of the island, extolling the islands ample fresh food and the beauty of its women. [Kauai Fine Arts]

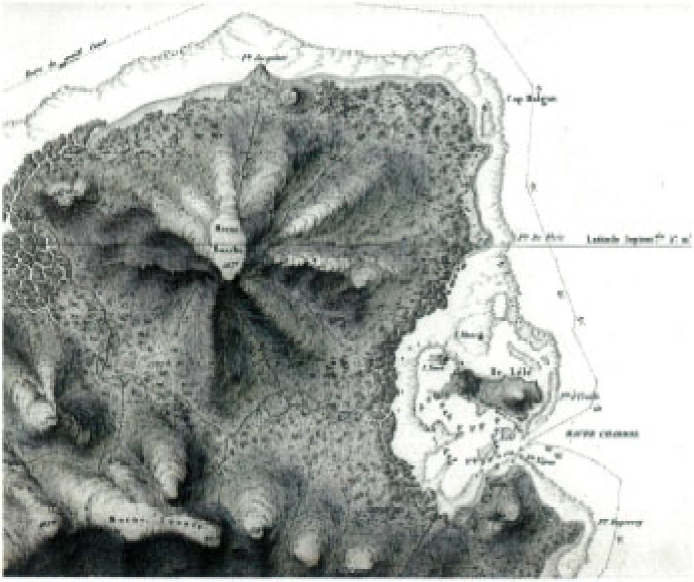


Fig. 189. Kosrae (detail), Louis Duperrey, 1827. The three-dimensional depiction of topography, first popularized in Cook's maps of Tahiti and other islands, has here become highly developed, if not necessarily accurate. [Kauai Fine Arts]

In his excursion through the Marshalls, Kotzebue inquired from natives as to the geography of the region. From them he learned that they were in the easterly of two chains, theirs being called Radak ("sunrise") and the other, western chain the Ralik ("sunset"). By etching atolls in the sand and using bits of coral to represent individual isles, the Marshallese were able to give their Russian visitors a sense of the entire region.

Seven years later, in April 1824, Kotzebue was back in the Marshalls. A new general chart of the northern Marshalls (Fig. 185) was prepared, its depiction of the Ralik (western) chain relying more heavily on islanders' input than the Radak chain.

After another reconnaissance of the Northwest Coast of America and a return to Hawaii, he set sail again for the Marshalls, now discovering Bikini (which he called Escholtz), to achieve infamy in 1946 when its people were displaced to allow the conducting of a nuclear explosion). The island's name, for no reason other than time proximity, became attached to the popular two-piece bathing garment that a French designer introduced four days after the first, widely publicized nuclear test.

Kotzebue, who always seemed at ease when in the Marshalls, waxed ecstatic about its people. He expressed the opinion that a major reason why the Marshallese "derived characters so much superior to those of other South Sea islanders" was due to "the superior purity of manners among the females. Experience teaches us, that wherever that sex is held in its due estimation, morals are proportionately refined." He witnessed a theater production by thirteen men and thirteen women, plus two men with shell horns. "Deficient as was my knowledge of the language, I was still able to understand the subject of this tragedy," a young girl who chose death rather than accept a husband she did not love.

Even today, the different names and spellings of these myriad atolls causes confusion, and names sometimes used to denote an individual islet of an atoll complex are at other times applied to the entire group. Mapmakers often interpreted each islet reported by explorers as a distinct island in the greater ocean, and incorporated every island reported without filtering them for the inevitable duplication. In one instance—Starbuck, in the Line Islands—two Nantucket captains with the same surname discovered the same island in the same year, 1823. First was Obed Starbuck, en route back to Massachusetts with a cargo of sperm oil, and then Valentine Starbuck, who brought the Hawaiian king Liholiho to England. One can easily forgive the mapmaker who dismisses coincidence as a possible explanation for the contradictory "Starbuck" reports.

Sir Francis Beaufort, hydrographer of the Admiralty at the time Darwin sailed, remarked that "the love of giving a multiplicity of new and unmeaning names tends to confuse our geographical knowledge. The name stamped upon a place by the first discoverer should be held sacred by the common consent of all nations; and in new discoveries it would be far more beneficial to make the name convey some idea of the nature of the place; or if it be inhabited, to adopt the native appellation, than to exhaust the catalogue of public characters or private friends at home."

The danger engendered by such confusion was obvious when in 1841 two vessels from Charles Wilkes's fleet, the *Peacock* and the *Flying Fish* under William Hudson, were sent to survey Kiribati. They found printed maps of the group "so inaccurate as to be a cause of danger rather than safety; for in them the islands are multiplied, and every hummock or detached islet on the same reef is represented as separate, and a name assigned to it."

Hudson found the Kiribati to be handsome people, the women among the prettiest of those he had seen in Oceania. Many of the men had scars from the weapons used—long swords and spears spiked with shark teeth. Relations with the Kiribati were often tense, and when a sailor disappeared, Hudson had a village destroyed. The sailor was never found. In the course of their survey of the small islands, two European beachcombers were found and given passage back to the West—one an Irishman who had married a chief's daughter, the other a Scot who had not seen a Westerner in seven years, both of whom had deserted English whaling vessels.

The Kiribati survey took longer than anticipated, longer than supplies had been stored for. Rations of food and water were reduced as the pair of ships made their final trek north between the Ralik and Radak chains and turned east for Hawaii.

Kotzebue, like the Spanish before him, mapped the Carolines from islander data. In the Marshalls on his first voyage, he came across two castaways from Woleai, some 2700 kilometers due west. From their testimony, and perhaps drawing from the existing map of Cantova (a copy of which is also included in his published account), Kotzebue made a map of the Carolines from Palau on the west through Chuuk and Ngatik on the east (Fig. 186).

In 1804, the US ship *Mary* left from Guam to search for sources of trepang ("beche-de-mer"), a sea cucumber considered a delicacy, in the Caroline Islands. Luis de Torres, an official on Guam who would become head of the garrison there, went with the *Mary* to discover why previous Carolinian visitors to Guam, who had promised to return, had never been seen again. This led to more geographic data. According to Adelbert Chamisso, naturalist with Kotzebue, when Torres reached Woleai, he "used the reports of the most experienced seafarers among the natives with regard to the courses they sail to draw a map of all the islands known to him." He remarks that its similarity to the Cantova map, "which was unknown to him, is very remarkable" (Fig. 187).

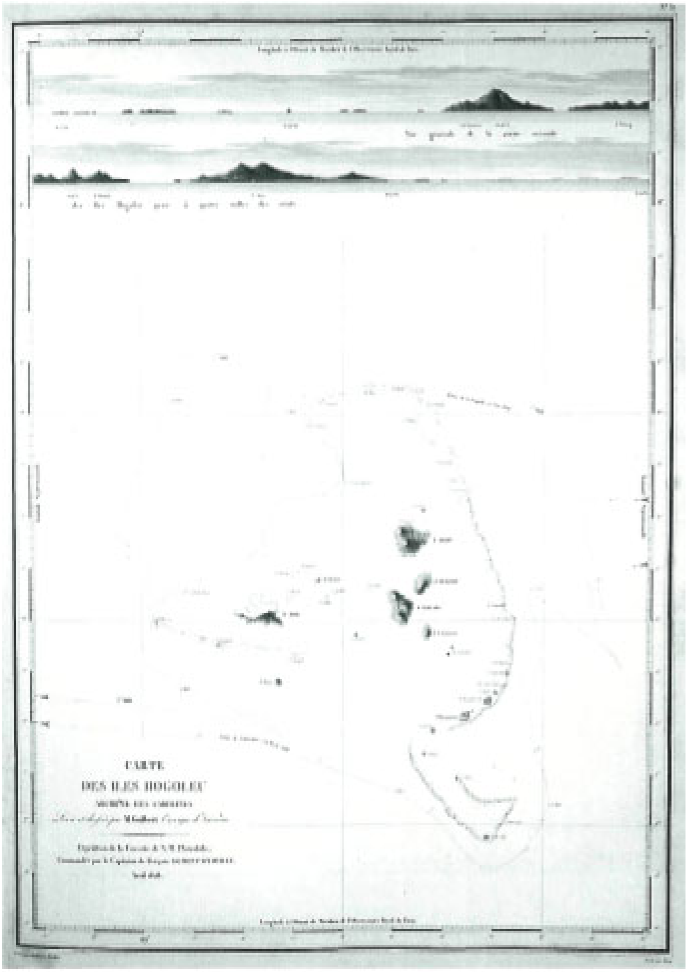
Torres's map of Woleai itself (*Guliay*) appears as an inset on a map of the Carolines published by Louis Freycinet, who explored the Carolines in 1819. Freycinet compiled the general map along the bottom, containing the Carolines, Marshalls, and Kiribati, while his hydrographer, Louis Duperrey, is credited with the main section recording the *Uranies* tracks northward from Pulusuk.

When Duperrey set sail in August 1822 to return to the Pacific, he stated his intention "particularly to visit the Caroline Islands, discovered by Magellan, about which, with the exception of the eastern side, examined in our own time by Captain Kotzebue, we have only very vague information, communicated by the missionaries, and by them learnt from stories told by savages who had lost their way and were driven in their canoes upon the Marianne Islands." He reached the Carolines in June 1824.

Foreign presence in the Carolines increased markedly during this period. The 1830s saw extensive European contact with Pohnpei, and in the 1840s with Kosrae (Figs. 188 and 189). When Pacific whaling peaked in the mid-1840s, the eastern Carolines were being used principally for resupplying, not for fishing. Chuuk escaped pronounced Western contact longer than any other major Micronesian archipelago, though it was likely encountered early on. Enclosed in a vast reef about 200 kilometers in circumference, early Spanish explorers almost certainly came across the group of islands. The islander-based map of Klein and its derivatives record Chuuk as *Hogoleu* and *Torres,* but when Frederic Lütke spoke with Chuukese on his visit of 1828, they were not familiar with the term *Hogoleu;* and *Torres,* which name remains today as an islet in southwestmost Chuuk, is more likely a transliteration of a Carolinian word than the surname of a forgotten Iberian captain.

Despite the key location of Chuuk from the whalers' vantage, about 800 kilometers southeast of Guam, and despite the fine natural anchorage afforded by its encircling reef, extensive contact with the group did not begin until the 1880s. Certainly occasional encounters did occur. One Manuel Dublon, for example, is said to have reached Chuuk in late 1814, but the only influence of the voyage on the map of Chuuk was affixing of the captain's name to one of its islands. The few early traders to settle in Chuuk did so for its trepang. Not until Louis Duperrey, in 1824, was an attempt made to give some cartographic form to the islands.

Fig. 190. Chuuk, Caroline Islands, Dumont d'Urville, 1830. Chuuk's lagoon encloses over 2100 square kilometers. [Donald A. Heald]



Even Duperrey, during his five days in Chuukese waters, never actually entered the lagoon. Instead, he circled the reef to allow his surveyors to map it from the outside, and brought aboard some Chuukese from one of the keys on the northern reef, learning from them as best he could about the islands within. The names they gave tallied sufficiently well with those of the Hogoleu of the Cantova map of 1722 for Duperrey to be confident that they were the same group. Duperrey's voyage also effected the first recorded settlement of Europeans in Chuuk: two Englishmen, at their own asking, were left behind there.

Frederic Lütke, sent into the Pacific in 1826 by Czar Nicholas I of Russia, reached the Carolines in November 1827. The task of surveying the group and its people occupied him for about a year, and the chart he composed of the islands was the best yet made. Lütke believed that some of the islands he charted were new discoveries, though most were probably known, mapped so poorly as to be confusing. He reached Chuuk in February 1828, staying by the reef for one day, having some limited trade contact with the Chuukese. Lütke identified Chuuk with the "Quirosa" of Mendafia's 1595 voyage, but that was actually Pohnpei.

The next step in the mapping of Chuuk was Dumont d'Urville (Figs. 190 and 191). At the end of 1838, d'Urville's two vessels entered inside the reef and began, for the first time, a comprehensive survey of the archipelago. For each of four days, while sailors in the vessels traded with the Chuukese, a party was sent out to explore the various islands. Relations between visitors and Chuukese were good except for an attack on one of the surveying teams.

Why was Chuuk bypassed by whalers in favor of Pohnpei and Kosrae through the latter nineteenth century? Chuuk was probably less suitable for providing ships' supplies than other islands in the area, and the nature of its internal wars disrupted food production more than other islands. Its women were less available to visiting sailors, and indeed d'Urville succeeded in winning the Chuukese women's trust only after a member of the expedition cleverly refused a gift of a girl for the night, explaining that he was under a taboo against such intimacy.

Pohnpei remained all but invisible to mapmakers until the voyage of Lütke. Not even the speck that Quiros's 1595 sighting of the island had placed on some manuscript charts found its way to published maps, and following that initial cursory encounter, the island hid itself from European *eyes* for another two centuries. In 1773, a Spanish vessel under Felipe Tompson, crossing the Pacific from Manila, reached what he called "Los Valientes," probably Ngatik, about 140 kilometers southwest of Pohnpei. Pohnpei itself was probably encountered fourteen years later by an American ship, the frigate *Alliance,* an important vessel in the American Revolution. After firing the final shots of that war, the *Alliance* was assigned to transport tobacco to Europe, but Congress canceled the enterprise when she was damaged by rocks, repairs being too costly to justify. The *Alliance was* ultimately sold to Robert Morris, who converted her to an East Indiaman. Under Thomas Read, a former captain in the Continental Navy, she left Philadelphia in June 1787, bound for China by a new route through Indonesia and the Solomon Islands. During the northbound sail from Melanesia, two islands were encountered which were not on Read's charts. The first, which might have been Pohnpei, he named "Morris" after the ship's owner, and the second he named for the ship herself, *Alliance*.

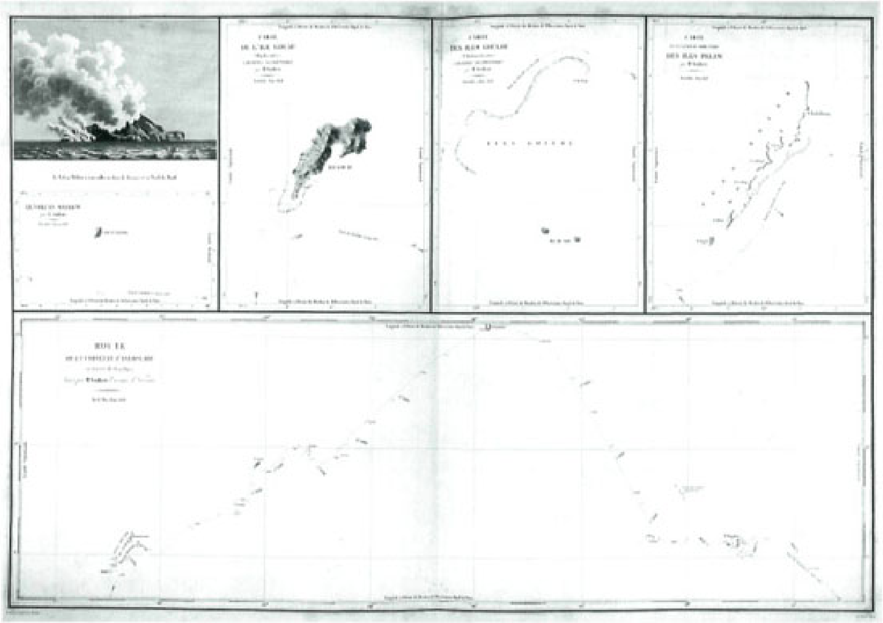


Fig. 191. Caroline Islands, Dumont d'Urville, 1830. D'Urville's map contains a general view of the islands extending from Palau through Chuuk, plus individual maps of four islands, from left to right being *Matthew* (Marakei), *Gouap* (Yap), *Goulou* (Ngulu), and *Pelew* (Palau). [Donald A. Heald]

Occasional encounters with neighboring islands continued, but not until Frederic Lütke reached Pohnpei itself in January 1828 was this largest of the eastern Carolines surveyed. The Russian expedition approached from the southeast, skimming near the ruins of Nan Madol, then veered west and put in at Kitti, where forty canoes greeted them (see Fig. 16). After two attempts to land to conduct scientific surveys were thwarted by the Pohnpeians, Lütke sailed up the west coast to Nett Harbor on the north (near what is now Kolonia), but the islanders again resisted any landing.

Their maiden charting of Pohnpei was first published in 1832 in Lütke's hydrographic atlas (Fig. 192). Despite the less than ideal conditions under which the survey was made, the result is admirable, with the island's contours well delineated, principal mountains shown, magnetic declination recorded, and, perhaps most important, reefs, and the passages through them, marked. Longitude is about 18 kilometers too far east. The map was added as an inset on a general map in Lütke's *Voyages* of 1836, and later used by Charles Darwin in his writing on reefs.

Now that Pohnpei was mapped, tortoiseshell lured many vessels there, one in 1833 taking 700 pounds' worth and leaving behind convicts. Resistance by the islanders failed to stop beachcombers, convicts, traders, and missionaries from settling on the island. The island is still sometimes known by the name of Lütke's sloop, *Senyavin,* though it already appears by its modern name (as *Pounipet*) on the widely disseminated Levasseur map (Fig. 5).

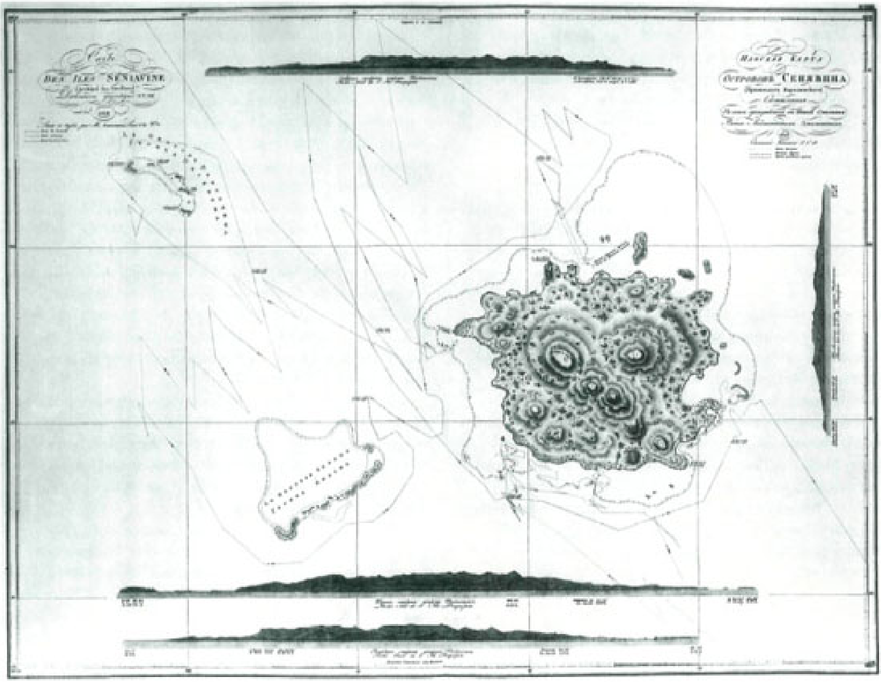


Fig. 192. The first published map of Pohnpei, surveyed by Frederic Lütke's expedition in January 1828, and published in his undated hydrographic atlas, ca. 1832. A Lt. Zavalichine is credited with the work, and his name still denotes a cape on the north coast. Ant Atoll lies to the southwest, Pakin Atoll to the northwest.

Chapter 11

Surveyors, Whalers, and Missionaries

By the close of the eighteenth century, all the principal archipelagos of the Pacific lay upon the map. "Important discoveries cannot now be made," the Russian explorer Krusenstern lamented in the early nineteenth century. "Here and there an island, or group of islands, which is unexpectedly met with, is all that the most fortunate discoverer can now hope for." The conquest of longitude allowed scattered islands to be charted accurately enough to be identified and revisited with confidence, and the haphazard exploration of the past gave way to government-sponsored surveys, independent entrepreneurs, and missionaries.

The principal trades that motivated Pacific exploration were sandalwood, trepang, sealing, whaling, and furs. Traders and missionaries often filled gaps missed by exploring expeditions, though their discoveries, and the charts they improvised, were seldom disseminated with the thoroughness of official expeditions, and their survey methods lacked the equipment and specialization of government enterprises. Government-sponsored surveys, however, were in large part undertaken for the ultimate benefit of private enterprise. French and Russian sponsorship each produced a succession of voyages in which mapping was a primary focus, each commander usually an apprentice of a previous voyage. United States traders were prolific in the Pacific, and the strained resources of their young nation produced a single, though immensely important, Exploring Expedition.

Even published maps were not necessarily distributed widely among those who should have had them. For example, Captain Henry Martin, in Tahiti in 1846, appears to have been using charts that were decades old. The master of an American trading brig, he explains, "brought me his charts. He is an old stager in the Pacific and gave me some valuable information as to the positions of islands inaccurately laid down by the early navigators & corrected since the introduction of chronometers."

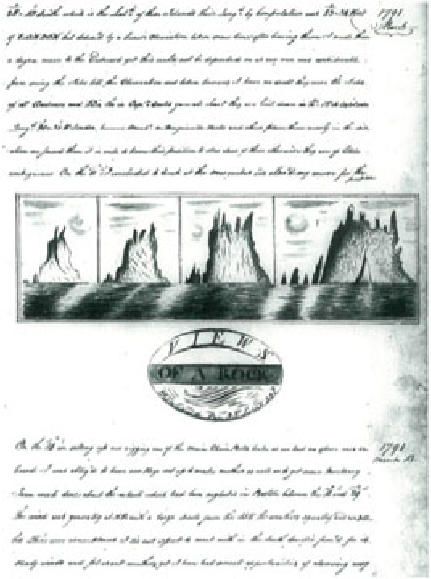
The Marquesas

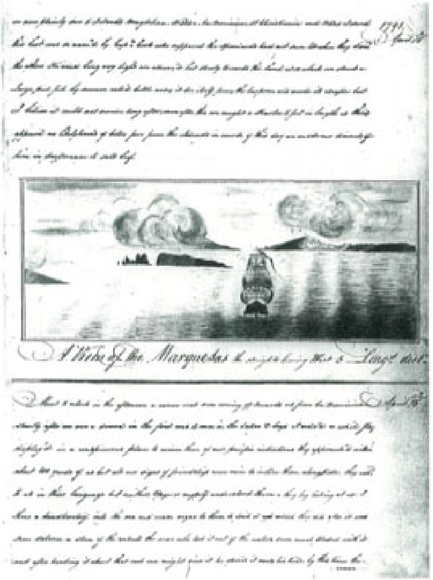
After Russian explorers and James Cook demonstrated the huge profits awaiting anyone able to collect furs in the American Northwest and sell them in China, entrepreneurs in the new United States were quick to exploit the opportunity. The first American circumnavigation, in the *Lady Washington* and *Columbia* under John Kendrick, had made handsome profits trading iron chisels for otter skins in the Northwest, and even though that enterprise returned to Boston in 1790 with a net loss due to other problems, it had proven the potential of trade between the Northwest and the Orient. To this end, the brigantine *Hope,* under *Columbia* alumnus Joseph Ingraham, sailed to the Pacific.

Ingraham's principal contribution came soon after entering the ocean, at the Marquesas on April 19, 1791 (Fig. 194). Sailing NNW from Hiva Oa (La Dominica), he was surprised to see two more islands, "as I knew we had seen and passed all the group called the Marquesas. I examined Captain Cook's chart of the world, his voyages, and Quiros's voyage…. I also examined Mons. de Bougainville's account of circumnavigators and lands discovered by them, and all my charts and globes of modern date. But I could find no account of more than five islands in the group called Marquesas de Mendoza, or of any land laid down on the site of the islands we then saw." Ingraham was admirably cautious, however. Although, "as I could not from the most diligent search find the least account of these islands, I conceive there could be no impropriety or presumption in naming them and claiming the discovery as my own," he added that "should it be hereafter proved that islands in the same situation had been seen before, I renounce my claim with as little ceremony as I assumed it."

The "situation" Ingraham assigned the islands was reasonably accurate, though slightly too far west; Nuku Hiva, for example, was placed at 8° 55' S, 140° 50' W, compared with its actual 140° 06' W He dubbed them with patriotic names from his very young country—Nuku Hiva was Federal Island, Ua Huka was Washington, and Ua Pou was Adams.

Like Quirós and Cook before them, the crew of the *Hope* seemed uniquely enamored of the Marquesans. "The girls were permitted on board without any hesitation," Ebenezer Dorr, supercargo on the voyage, wrote in his log and journal."They were in general small and young, quite naked and without exception the most beautiful people I ever saw. Their shapes and features were exquisite beyond description. They being naked there was no deception by dress. Their complexion varied, some of a copper and others of as fine complexion as any of ourselves. Their hair was various colors, long and fine, wearing it flowing in its natural curls. Of their ornaments we could not see any and suppose but few are worn by them…. On the whole their beauty and gentleness with the rest of their charms were such that few could but admire them and none resist the impulse of the moment. They do not appear to have any idea of shame or criminality."


VIEWS
OF A ROCK


A View of the Marquesas

Above left: Fig. 193. En route to the Marquesas, Joseph Ingraham wrote in his *Journal* of an island jutting from the sea: "It appeared nearly perpendicular and inaccessible on all sides except the N.W. point where a boat might possibly land…." *Above right.* Fig. 194. A view of the Marquesas from the same journal. [Library of Congress]

Such waxing breathed fresh life into Oceania as the realm of the Noble Savage at a time when better familiarity with Tahiti was convincing others that if that island had ever been an earthly paradise, a quarter century of European contact had ended it. Of more enduring value, Ingraham demonstrated the value of the Marquesas as a refreshment and reprovisioning port of call for vessels headed to the Northwest Coast for the fur trade. Both these aspects helped place the Marquesas on the cerebral "map."

Ingraham's surviving journal contains several maps of the Northwest Coast and of the Pacific between Hawaii and Taiwan (Figs. 195 and 196). Strangely, of this one significant Pacific discovery, there is only a small view (Fig. 194), no map. Although they were able to establish the coordinates of their Marquesan discoveries with reasonable competence, they lacked the means to produce a detailed map of them, being merchants on a risky venture, not explorers taking risks for academic ends.

Ironically, two months after Ingraham's discovery of the northern Marquesas, a French captain "discovered" the same new Marquesa islands, and similarly christened them with nationalistic names from his own post-revolutionary country. This was Etienne Marchand, who had been infected with the desire to pursue the fur trade after meeting Nathaniel Portlock in St. Helena on the way home from his circumnavigation. The Marquesas had not been a planned stop en route to the Northwest Coast, but the islands were the most convenient to remedy an unexpected shortage of fresh water.

Marchand chanced upon Ingraham's new islands by following canoes that came daily to trade with them. While in Resolution Bay, Marchand saw that among the canoes from which they purchased supplies and "which returned, every evening, to its respective island, one or two always directed their course toward a point of the horizon where hitherto navigators knew no land." So when Marchand left Resolution Bay, he followed these canoes to the island of Ua Pou, beginning his independent discovery of the northern Marquesas. To the group he gave the name *Iles de la Revolution,* unaware that Americans had already been there. Unlike the American traders, the expedition charted the islands, and their records were far more comprehensive, detailing the stilt-walking, tattooing, body adornments and other arts, canoe making, and fishing techniques on the island of Tahuata.

Further duplication of Marquesa Island names occurred when the *Daedalus,* under Lieutenant Richard Hergest, stopped in the Marquesas in May 1792 en route to Hawaii to bring supplies to George Vancouver. The eventual return to their Marquesan names remedied the resulting confusion.

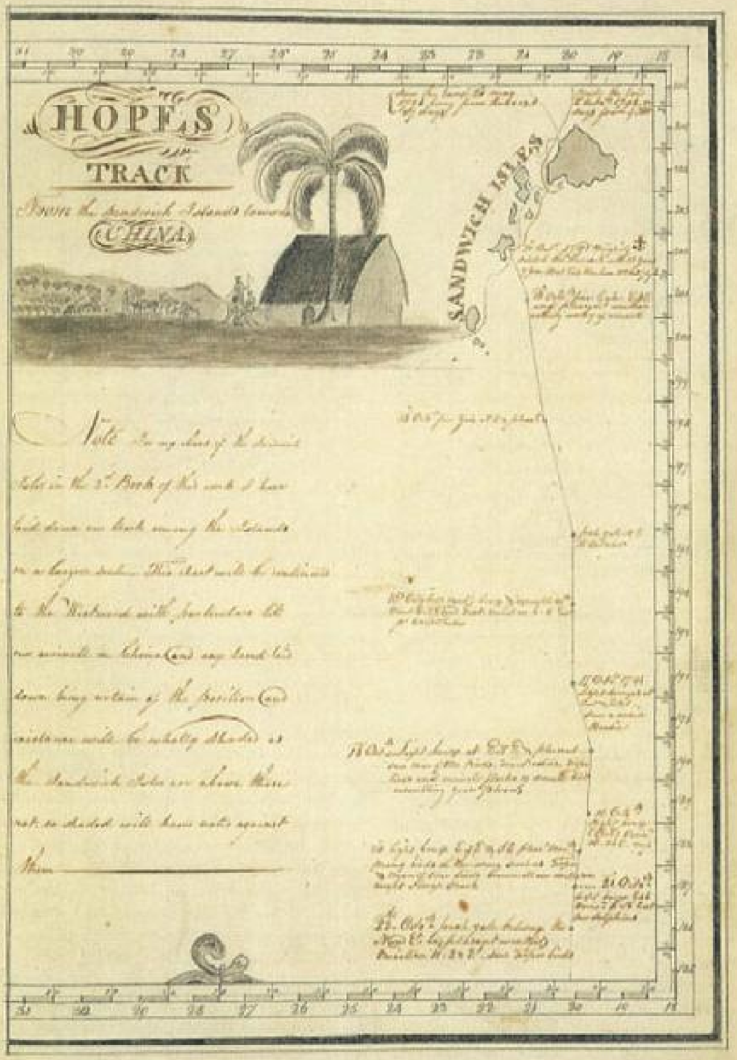

HOPE'S
TRACK
From the Sandwich Islands towards
CHINA
SANDWICH ISLES
Note In my chart of the Sandwich Isles in the 2d Book of this work I have laid down our track among the Islands on a larger scale. This chart will be continued to the Westward with particulars till we arrived in China and any land laid down being certain of the position and distance will be wholly shaded as the Sandwich Isles are above. those not so shaded will have notes against them

Fig. 195. The Northern Pacific, from Joseph Ingraham, *Journal of the Brigantine Hope,* 1791. [Library of Congress]

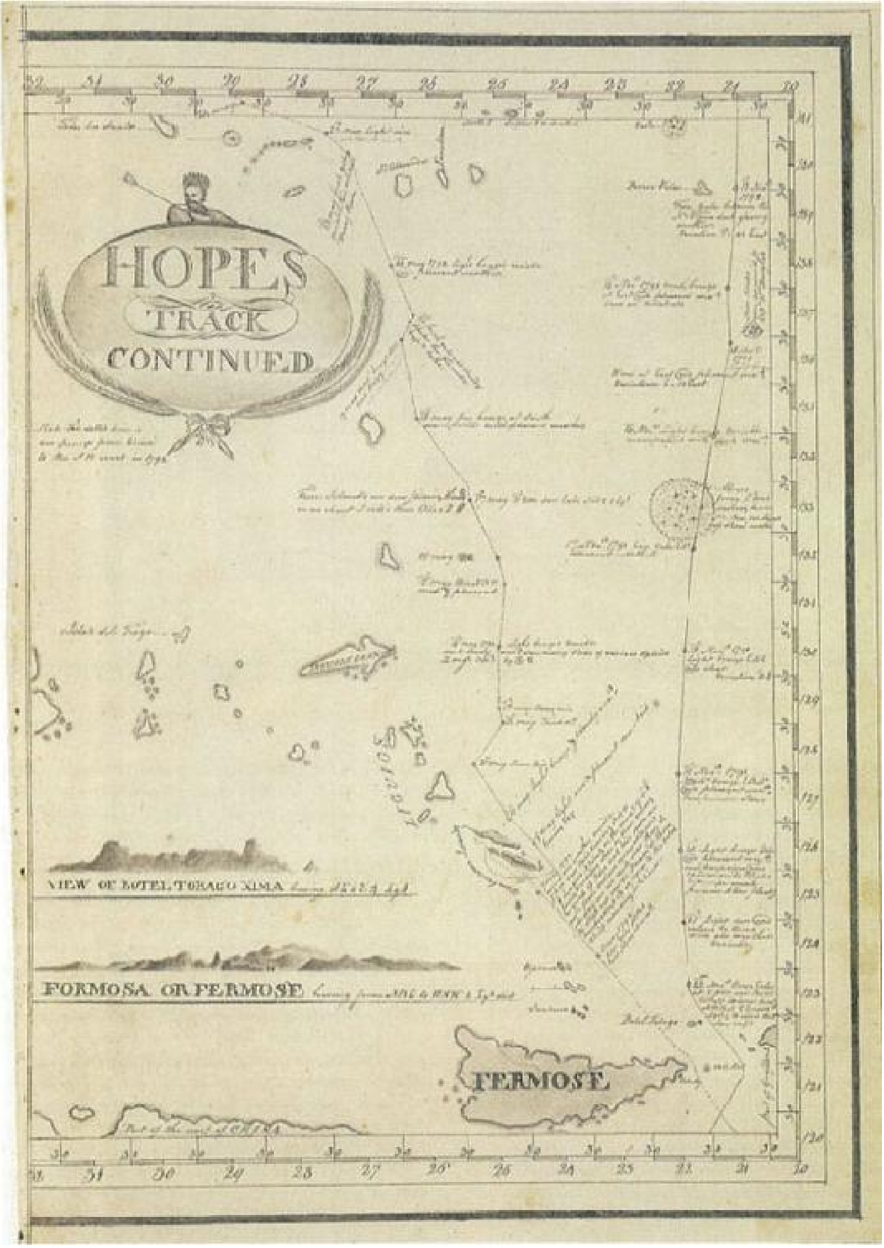

HOPES TRACK CONTINUED
VIEW OF BOTEL TOBAGO XIMA
FORMOSA OR FERMOSE
FERMOSE

Fig. 196. The northern Pacific, through Taiwan on the west (bottom), from Joseph Ingraham, *Journal of the Brigantine Hope,* 1791. Ingraham, covering these seas in sailing from Hawaii to China in 1791, took the opportunity to muse over "islands and shoals, laid down in Lord Anson's [Fig. 111] and many other charts, which we sailed over with great ease—as no such lands or shoals exist." [Library of Congress]

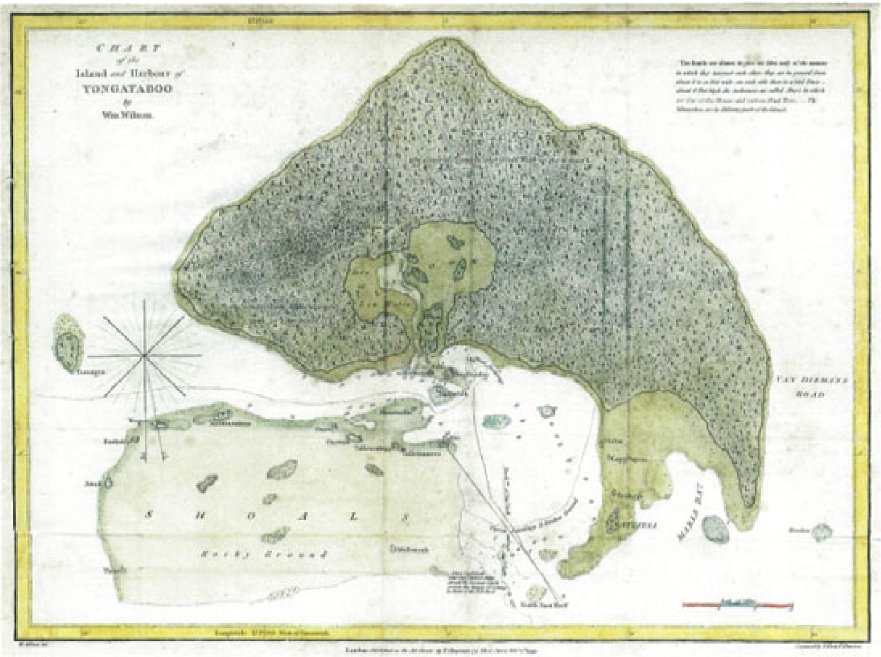


Fig. 197. Tongatapu, southern Tonga Islands, James Wilson, 1799.

The London Missionary Society

The tales of Polynesian life that titillated the reading public and enlivened chat in portside pubs, also caught the attention of religious leaders and led to the establishment of the London Missionary Society in 1795. James Wilson, chosen to lead the first proselytizing voyage to the Pacific, selected his nephew William Wilson as first mate, and it was William who made the maps that accompanied the printed account of the voyage. Tahiti, the Marquesas, Tonga, Hawaii, and Palau were selected to receive missionaries, though the latter two were later omitted from the itinerary

With four clergymen, several artisans, and wives and children, the *Duff* headed for Cape Horn, but wild seas made her crew reconsider. Now by way of Africa, Tahiti was reached in early March 1797 (Fig. 144), and Tongatapu (Fig. 197) a month later. Sails were then set to backtrack to the east for the Marquesas, first falling far to the south in order to avoid the Tuamotus. Along the way, just southeast of the Tuamotus and north of Pitcairn, the "Crescent Island" of Temoe was discovered and mapped. The small population of Temoese were not flattered by their attempt to land and did not appear to understand their Tahitian interpreter, so the Duff continued for the Marquesas rather than risk confrontation. The coordinates they assigned Temoe were near perfect.

Sailing to the northwest they discovered the Mangareva group (Fig. 198), which they called the Gambier Islands, whose people seemed to be like those of smaller Timoe. "The main island, and those scattered about it," Wilson wrote, are "all high, and the reef keeping the sea quite still about them, they present a view romantic, wild, and barren."

The sensuous mystique of the Marquesas continued with the arrival of the *Duff,* the encounter producing two of the more humorous incidents recorded in missionary travels. "Our first visitors from the shore came early; they were seven beautiful young women, swimming quite naked, except a few green leaves tied round their middle." When the girls came aboard the ship, "our mischievous goats" forfeited even this token adornment: as the girls "turned to avoid them they were attacked on each side alternately, and completely stripped naked," the goats on one side tearing off the leaves as the girls avoided those on the other. Goats seemed to be adept at diverting introductions—recall the rude kick given the first Tahitian to step aboard a European ship (Wallis, page 140 above).

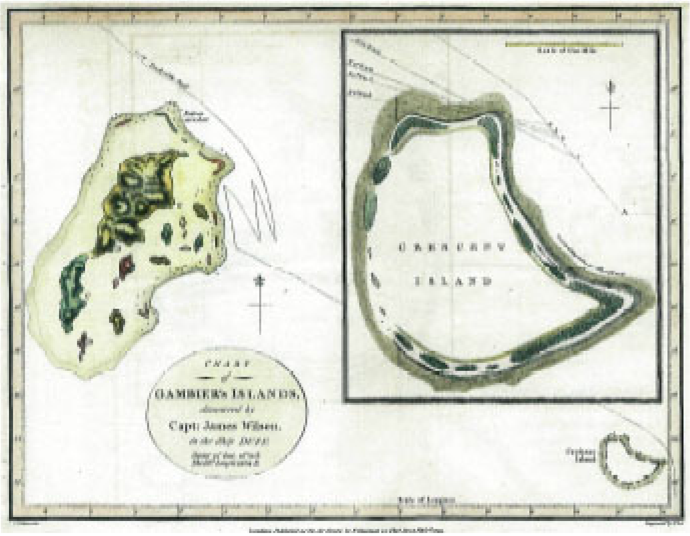
When the two intended missionaries were sent ashore, the local chief met them to be their host, wishing to "treat them with an excursion to another valley." One of the Englishmen, William Crook, readily agreed. The other, John Harris, refused, so the chief, "desirous of obliging him," accommodated him as he thought most hospitable: he assigned a woman to remain with him for the night. But when Harris steadfastly declined the hospitality, the woman, baffled that a man would refuse her company, "became doubtful of his sex," and related the incident to her female friends. Together they returned to the shore in the middle of the night as the missionary slept, tore off his clothes and "satisfied themselves concerning this point." Thus abruptly ended the stay of one of the first two European missionaries in the Marquesas, who fled to the *Duff "in* a most pitiable plight, like one out of his senses."

Crook stayed. The following year, in 1798, the American captain Edmund Fanning reached Tahuata and found Crook, well tanned and wearing nothing but a loincloth. Crook warned that an Italian deserter on the islands was trying to kill him and to capture Fanning's vessel. Crook was offered passage to New York, but instead chose to stay on another of the Marquesas, Nuku Hiva.

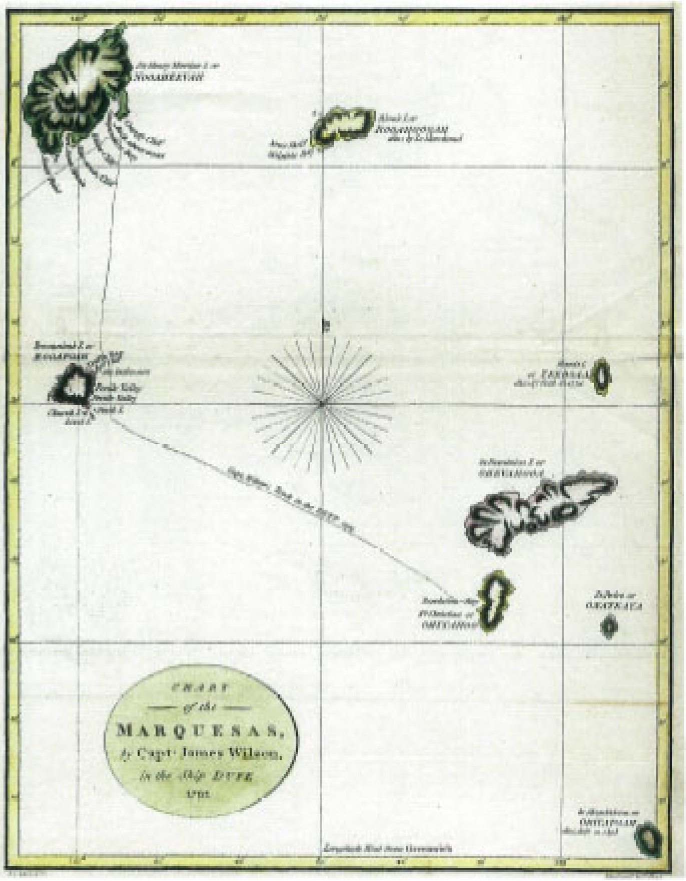
After the company completed their missionary tasks in the Marquesas, they set about improving the mapping of the archipelago. "As we had reason to suppose them erroneously marked in the sketch we had on board", they headed for "Trevenen's" (Ua Pou) and "Sir Henry Martin's" (Nuku Hiva) Islands, "intending to observe their relative situation to Santa Christina" (Tahuata). Wilson's map improves upon Cook's only in that it includes Nuku Hiva, Ua Huka, and Ua Pou, which islands Cook did not know. But Wilson's delineation of Hiva Oa and Mohotane are actually a step backwards from Cook. Nuku Hiva is centered about 12 kilometers too far east, and its north coast is little known.

Beginning her trek home after returning to Tahiti and Tonga, the *Duff hit* coral rock in Fijian waters. For some nervous moments their imagination, "quick and fertile on such occasions," saw Fijians "dancing round us, while we were roasted on large fires." Daylight came and "showed us the dangers which lay hid on every side … and made us very desirous to get clear of them as fast as possible." A maze of islands was skirted, "some at a distance from the tacks of Captain Bligh in the launch of the Bounty, and afterwards in the Providence." Wilson, like those before him and still for decades to come, was unprepared for the challenges of Fiji's waters, for which no good navigational chart existed. These islands "doubtless are connected with those which the people at Tongataboo call the Feejees … they are high, and all we could distinctly see appeared fertile." The *Duffs* tracks are marked on Wilson's chart (Fig. 200), as are the tracks and discoveries of Bligh on his flight to safety on the *Bounty's* launch after the mutiny.

Continuing northwest en route to Palau, Wilson came across "ten or eleven separate islands, two or three of which were of considerable size," in waters where no islands were recorded (Fig. 201). Two men in a canoe approached the *Duff* but kept a cautious distance as they "hooped and Hallooed in a harsh tone, not seemingly as a menace or defiance, but the effect of surprise and a mixture of other passions at so wonderful a sight, having, in all probability, never beheld a ship before." These they named "Duff's Group" after their vessel, by which name the archipelago, about 150 kilometers northeast of Santa Cruz, is still known. Unlike Wilson's other maps, the Duff chart does not mark coordinates. Wilson explains why: "the weather being gloomy, with drizzling rain, we had no observation for the latitude."



Above: Fig. 198. Mangareva, James Wilson, 1799. *Below:* Fig. 199. The Marquesas Islands, James Wilson, 1799.



Russian Expeditions Combine Science and Commerce

Before the nineteenth century, Russian expeditions pursuing the fur trade had surveyed northern Pacific shores, but not Oceania. A new crop of Russian expeditions combined scientific exploration with those commercial goals, yielding some of the finest early large-scale mapping of Oceania. These began with A. J. von Krusenstern, who, like most Russian sailors of the day competent to command a major voyage, had trained in England.

Based on what he observed in a first voyage to the Pacific, Krusenstern convinced the czar of the immense profits possible by conducting the fur trade by sea: sailing to Alaska to resupply the outposts there and collect furs, then to Canton to sell the furs and load Asian goods, then around Africa and back to Russia. The czar added to this list scientific objectives, and pursuing recent overtures from Japan for Russian trade at Nagasaki. Two vessels, the *Nadeshda* and the *Neva,* were purchased in England by Urey Lisiansky and supplied with the finest instruments and the latest charts. Krusenstern commanded the enterprise in the *Nadeshda,* while Lisiansky became first in command of the *Neva.* They sailed in August 1803, Nuku Hiva being chosen as a rendezvous should the fleet become separated, as it did.

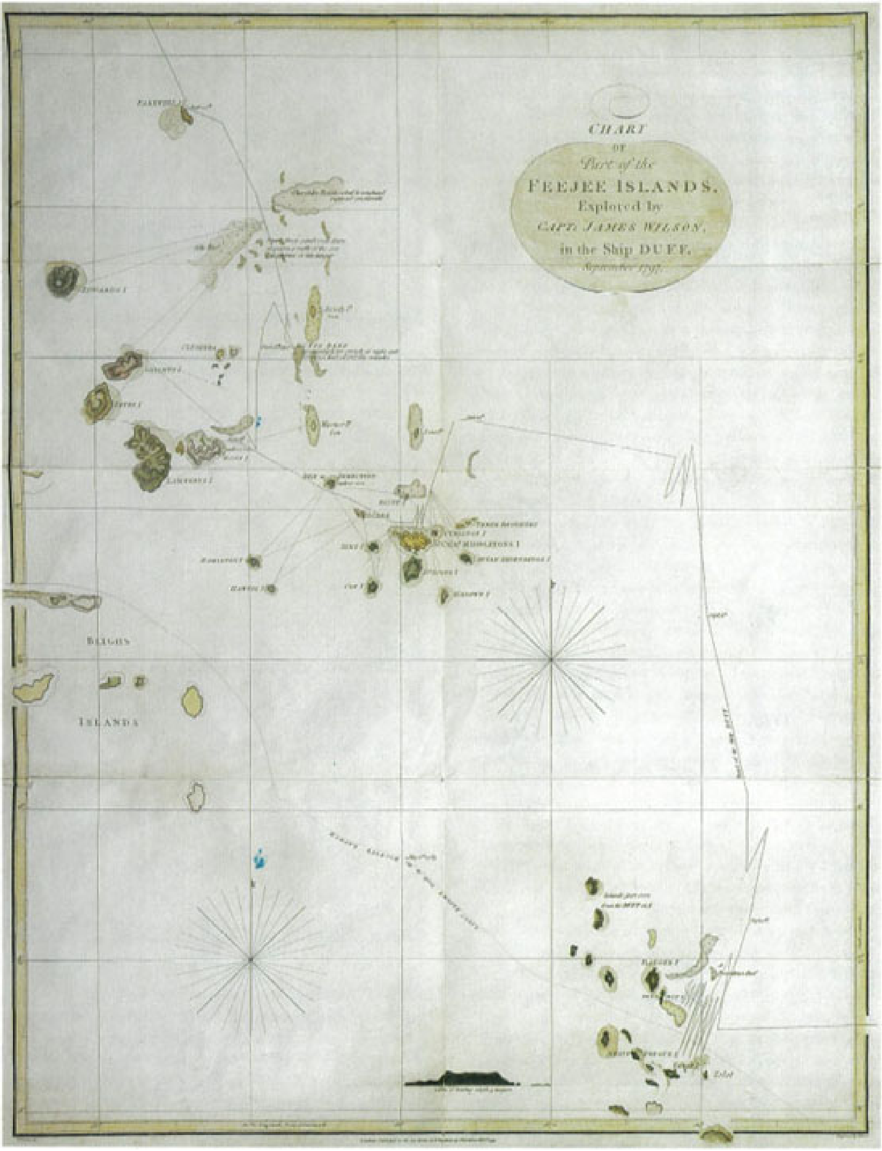


CHART
OF
Part of the
FEEJEE ISLANDS,
Explored by
CAPT. JAMES WILSON,
in the Ship DUFF,
September 1797.
BLIGHS
ISLANDS
Islet

Fig. 200. Chart of Fiji, James Wilson, 1799. "Blighs Islands" in the lower left are Viti Levu and the Yasawa group, which Captain Bligh and company discovered en route to Timor in the launch in which the *Bounty* mutineers had sent them adrift. The islands in the lower right are the Lau group.

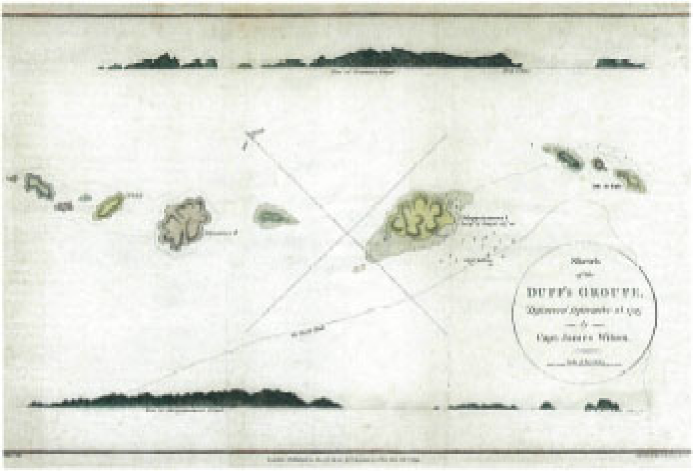


Fig. 201. The Duff group, James Wilson, 1799.

On the way to the Marquesas, the *Neva* skimmed Easter Island, trading offshore with the islanders and charting the coast. The fleet rejoined at the Marquesas as planned, finding Edward Roberts, an Englishman who had been living there for nine years and who had married a chief's daughter, and his adversary Jean Baptiste Cabri, a Frenchman who had also settled in the islands. Both of these ex-patriots proved invaluable for the first-hand knowledge they had amassed of the islands. Cabri unintentionally (?) sailed back to the West when the ships precipitously left in strong winds, then earned his livelihood exhibiting his considerable Marquesan tattoos.

When Krusenstern and colleagues set about perusing the Nuku Hiva interior, they "entered a romantic, beautiful country, and found ourselves in a large forest, that seemed to reach to the chain of mountains behind. The greatest part of the trees in this forest were apparently about seventy or eighty feet high, and chiefly cocoa and bread-fruit trees, as was easily to be distinguished by the fruit with which they were all loaded. Several winding rivulets, that rushed with considerable noise and rapidity from the mountains, and whose beds of large broken rocks formed the most beautiful cascades, crossed each other and watered the habitations of the valley. In the vicinity of these habitations, a number of plantations of taro-root and cloth-mulberry, laid out in great order, and surrounded with a neat enclosure of white staves, bore the appearance of belonging to a people who had already carried cultivation to a considerable extent; and these delightful prospects assisted a great deal in removing the unpleasant sensations we experienced upon reflecting, that we were amidst the dwellings of cannibals."

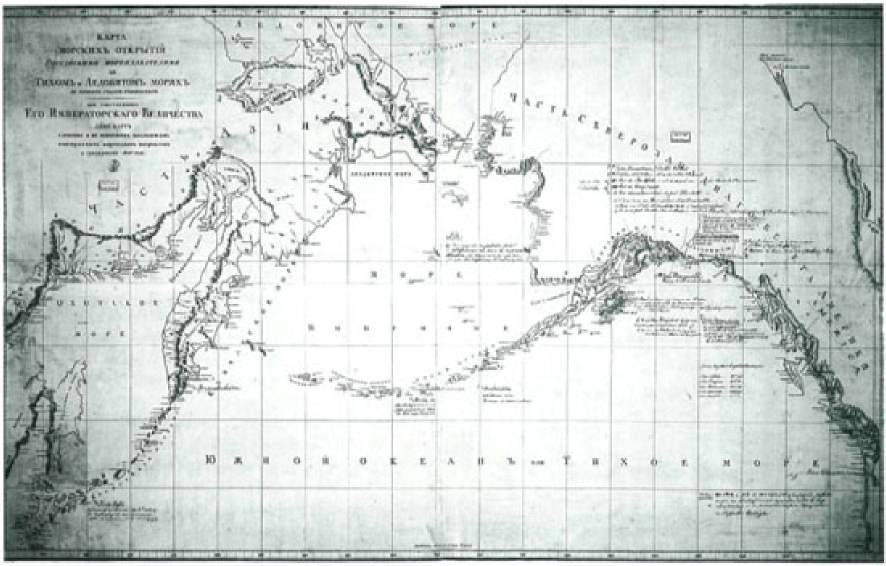


Fig. 202. "Map of the Marine Discoveries of Russian Navigators in the Pacific and the icy seas, accomplished in various years. Compiled at His Imperial Majesty's depot of charts, corrected by the latest observations of foreign navigators, and engraved in the year 1802." Separately published Russian map, extending from Vancouver through Japan, composed just as a new wave of Russian voyages improved the mapping of the northernmost Pacific. [Library of Congress]

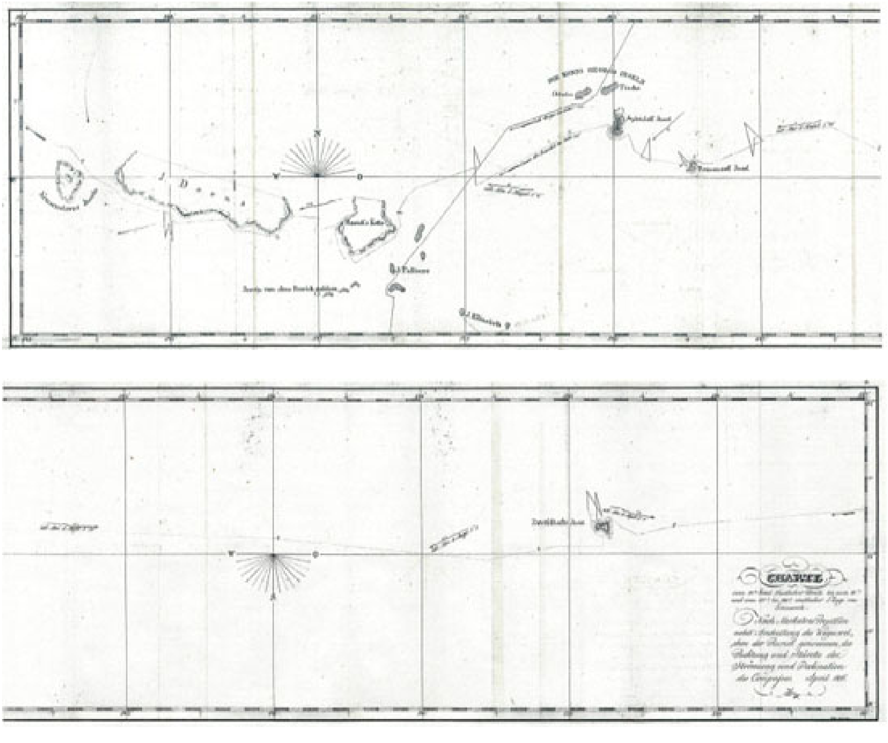


Fig. 203. Tuamotu Islands as mapped by Otto von Kotzebue on his first voyage. Vienna, 1825.

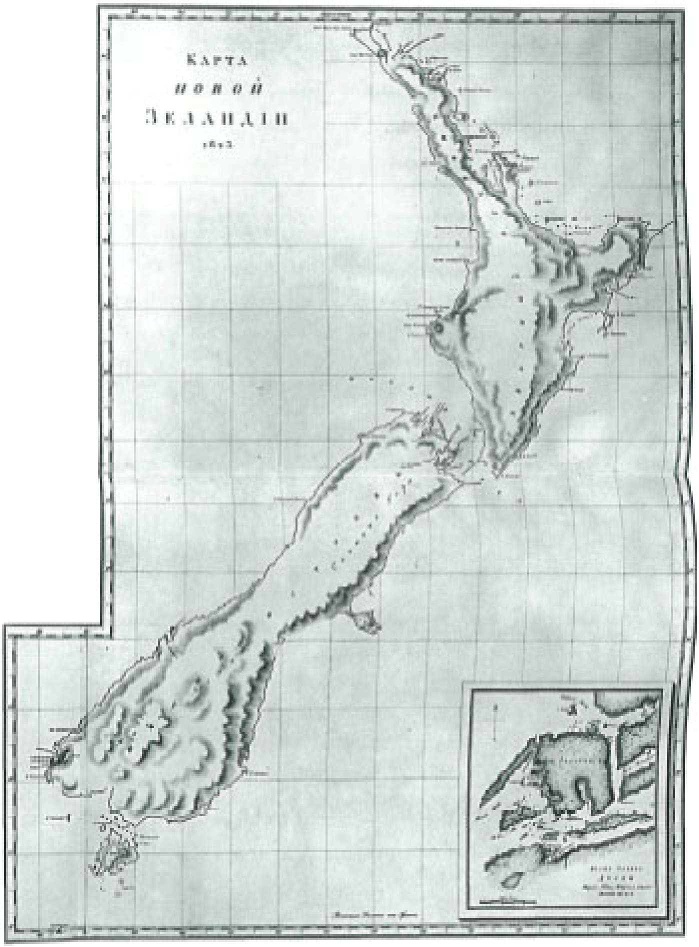


Fig. 204. New Zealand, from Krusenstern's atlas, 1827. [Martayan Lan, NY]

Though Krusenstern did not hold their civilization in high regard, he found socio-political meaning in the Marquesans' physical beauty. Not only will the beauty of other peoples of Oceania "be found to bear no comparison" with those of the Nuku Hiva, but in addition their beauty is not "a distinction which nature has given to the *erihs* or nobles, but exists here almost without exception." His two explanations for this "classlessness" of beauty is insightful to the times: first was "owing to the more equal distribution of property," and second in what he perceived as a lack of despotism, believing that the "Nukahiwer does not acknowledge in the person of his king, tyrant to whom he must sacrifice his best power and abilities, without daring to consider his own preservation, or that of his family."

When he sent one of his officers "to examine the coast of Nukahiwa to the west of the bay of Tayo-Hoae," he "discovered a harbor about five miles from the bay, of which he brought me so favorable an account, that I determined to visit it." An hour and a half of rowing in two boats, "we arrived there at ten in the morning. At the entrance of the bay, the west side of which was formed by lofty and perpendicular rocks of a very wild but beautiful appearance, we found twenty fathoms water over a bottom of fine sand and clay … you open upon the finest bason that can be imagined: it lies in a north-east and south-west direction, is about 200 fathoms deep and 100 wide: at the bottom of it is an even sandy beach, and behind this a green flat resembling a most beautiful bowling-green. Streams of clear water flowed in various places from the mountains that rise beyond the beach and the green flat behind it; and in a very picturesque and inhabited vale, lying a good deal to the northward of the entrance, and by the natives called Schegua, is a rivulet, which, considering the size of Nukahiwa, cannot be deemed small, that empties itself into the northern side of the bay." The advantages of such a bay were that it "is so completely land-locked, that the most violent storm would scarcely have any effect upon the water, and a ship in need of repairs could not wish for a finer harbour, for such a purpose." In his surveying, Krusenstern's policy regarding the chronometer was that if lunar observations and the chronometer were within a quarter of a degree, the chronometer would be trusted, but if a series of clear Lunar observations failed to agree with the instrument, then the chronometer would be presumed to be in error.

Various aspects of Marquesan life were documented, from stilt-walking described earlier by Marchand's visit, to polyandry. It was the latter that now seemed to fascinate the West; Lisiansky describes how rich girls would take two husbands, one subordinate to the other. The secondary husband is "generally poor, but handsome and well-made." Although he is sometimes chosen after marriage to the first husband, more commonly two men would offer themselves jointly to the same girl, who if she accepts them would decided their ranking.

After Krusenstern reached Russia in 1806, the wealthy Count Romanzov proposed that a new expedition be sent to search for a Northwest passage. Krusenstern recommended Otto von Kotzebue, who at age fifteen had been cadet clerk on the earlier voyage. Instruments were purchased in London by Krusenstern, and a vessel was built in Abo, Sweden (now Finland). The expedition sailed from Kronstadt, in the bay off St. Petersburg, on July 30, 1815. Krusenstern set about compiling his *Atlas of the Southern Sea,* not published until 1827 in St. Petersburg (Figs. 151 and 204).

A stop in Plymouth allowed Kotzebue to meet with a surveyor from the Vancouver expedition, and to correct the expedition's chronometers. They also purchased charts by Horsburgh, Purdy, and Arrowsmith, and other supplies "which are no where to be had better and cheaper than in London."

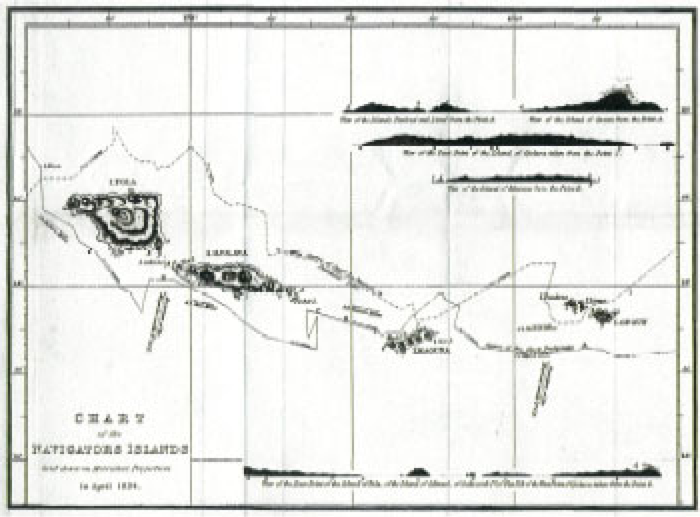
Kotzebue entered the Pacific around Cape Horn early in 1816, sailed up the Chilean coast to Conception Bay and then west into the ocean. After a brief stop in Easter Island—made difficult because apprehensive islanders remembered abuses by an American vessel in search of slaves eleven years earlier—Tikahua, an atoll in the Tuamotus, was discovered and named for his mentor, Krusenstern (leftmost island in Fig. 203).

Continuing west, they sailed through the Radak chain of the Marshalls (see Chapter 10), on to Kamchatka and through the Bering Strait, then to California and on to Hawaii. He tried, but failed, to locate an island discovered in 1807 by Charles Johnston while in command of the *Cornwallis* —known to Kotzebue after the discovering vessel's name. Tiny Johnston Island, now used by the US military, was not mapped in detail until 1892, when it was being considered as a cable station.

In 1823, Kotzebue set off on a second exploratory voyage to the Pacific. After docking in Portsmouth for a trip to London to purchase new charts, chronometers, and astronomical instruments, they sailed around the Horn and made for the Tuamotus once again, verifying the positions he had assigned individual islands on his previous voyage, discovering Fangahina and Aratika, then on to Tahiti and Samoa.

Kotzebue was also a bit harsh on the existing mapping of Samoa, his next objective (Fig. 205). "Neither Roggeveen nor Bougainville have given their situation accurately," he wrote, "nor have these original errors been perfectly corrected by the unfortunate La Perouse, or the Englishman Edwards," the last being a reference to the voyage sent to capture Bligh's mutineers. Kotzebue does indeed map the Samoas more completely, though the coordinates calculated by La Perouse (Fig. 166) were nearly as good as his. Like his predecessors, Kotzebue missed Pago Pago Harbor.

Fig. 205. Samoa, Otto von Kotzebue, London, 1830. [Library of Congress]



Nor did the Samoans of Tutuila *(Maouna*) fare well in Kotzebue's estimation, his account referring frequently to the attack on La Perouse's crew. He spoke of being "surrounded by the descendants of the barbarian murderers," and the suspicion that "some of the actors in the atrocious deed might even themselves be amongst the crowd which now assembled around us."

From a Samoan isle which Kotzebue called the "Flat Island" (Manono), a chief came and presented presents. When Kotzebue asked how he had come across a parasol and a Spanish dollar he had with him, he explained that he had sailed in his canoe to Tongatapu—which lies about 900 kilometers SSW. After completing his new chart of the archipelago, Kotzebue sailed for his favorite jaunt, Otdia in Wotje (Marshall Islands), of which he had produced a fine chart on his previous voyage (Fig. 184).

The last of the Russian Pacific voyages of this period was that of the great Frederic Lütke, whose principal contributions were his mapping of the Caroline Islands (Fig. 192), and to a lesser, but still significant extent, mapping of the northernmost Pacific (Fig. 41).

The French Expeditions

Two surveying expeditions were sent to tackle poorly known coasts of southern and western Australia at the turn of the nineteenth century, one English, under Matthew Flinders (1801-3), the other French, under Nicolas-Thomas Baudin (1802-3). Both expeditions resulted in excellent charts of Australia.

Aboard the Baudin expedition were two brothers, Henri and Louis Freycinet. Henri conducted some of the important surveying of Australian shores, in King George Sound and the southern coast through Cape Leeuwin, and along Australia's northwestern coast. Louis assisted the naturalist Francois Peron with the publication of the voyage's materials, and when Peron died, completed the project. Their map of Australia (Fig. 206) was issued in 1811, three years before that of Flinders, whose ailing ship had forced him to put in at Mauritius, where he was imprisoned 1803-10 as a spy.

With the maps of Freycinet and Flinders, the whole of the Australian coast was finally laid down comprehensively. Freycinet's nomenclature was more idiosyncratic, for example, designating the entirely eastern breadth of the southern coast after Napoleon and filling it with French place names, such as *Bonaparte* for the Spencer Gulf and *Josephine* for the Gulf St. Vincent. A subsequent edition of the map conformed to the Flinders map in labeling regions after their discoverers, including Baudin himself.

Louis Freycinet returned to the Pacific as commander of his own expedition in 1817-20, as France was pulling itself from the chaos of the Revolution and the ensuing Napoleonic period. His stated goals emphasized relatively esoteric matters of science, such as the true shape of the earth, magnetic phenomena, tides, currents, and winds. Life at sea, though still difficult, was becoming more humane than the voyages of just a few decades earlier—the 350-ton corvette *Uranie* carried canned food and machines for distilling sea water. Among the crew was Freycinet's young wife, disguised as a boy—a serious breach of navy regulations. Contemporary society was so endeared by the romance of their story, however, that he was never censured.

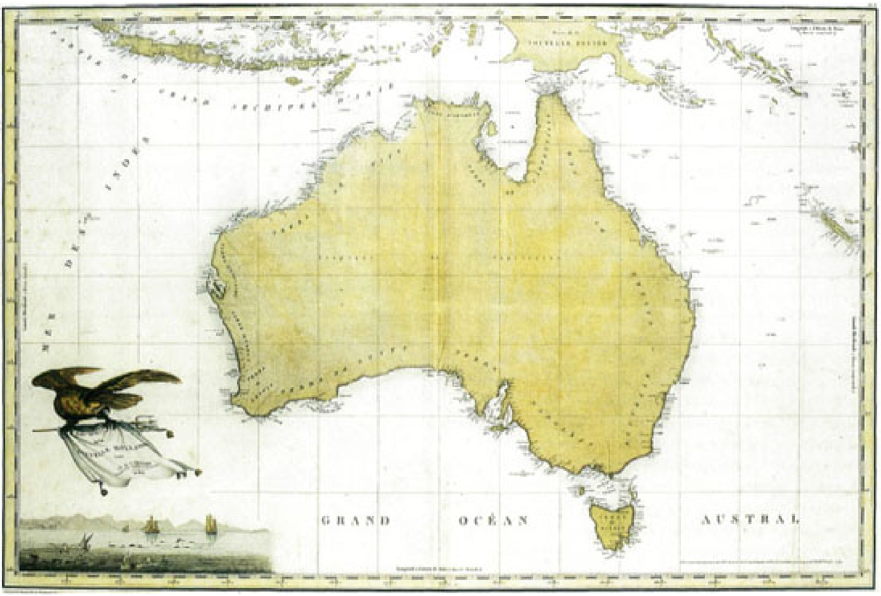


Fig. 206. Australia, Louis Freycinet, 1808. [Gowries Galleries]

Freycinet entered the Pacific by the Indian Ocean, stopping at Shark's Bay in western Australia and then continuing north to Timor, the Moluccas, thence the Caroline Islands, north to the Marianas, and finally due east to Hawaii, the limit of the outbound voyage. In Hawaii, he was warmly received by the Hawaiian Court, whose preoccupations with liquor and Christianity were obvious.

Routing their return via the south Pacific, Freycinet had intended to stop at Tahiti but was prevented by the prevailing winds, despite the crew's self-motivation to conquer those winds. After passing through the Samoan Islands, they reached Port Jackson in Australia, and set out for France by recrossing the Pacific at a southerly latitude and rounding South America into the Atlantic. But the *Uranie* was wrecked in a storm off Tierra del Fuego, with the loss of some of its archives. The crew survived two months as castaways until an American vessel, the *Mercury*, chanced by. Freycinet purchased the American vessel and returned to France, where he was acquitted in a court martial for having lost his vessel, but then had difficulty getting the financial backing with which to get the account of his expedition published.

Freycinet's voyage contributed to the corpus of ethnological, natural history, magnetic, and hydrographic data. The glamor of discovery did not accompany his return—even a small island in the Samoas he "discovered" and named Rose for his wife, was in fact the Vuyle of Roggeveen. Charles Darwin studied this "chart of Rose Island … given by Freycinet, from which I should have thought that it had been an atoll," but other reports suggested that it "cannot be properly classed with atolls, in which the foundations are always supposed to lie at a depth, greater than that at which the reef-constructing polypifers can live."

Louis Isidore Duperrey, a hydrographer and member of Freycinet's expedition, proposed a new voyage which gained official approval and was granted a 380-ton corvette. Duperrey planned a route which would complement Freycinet's itinerary. He intended "to rectify, either by direct, or by chronometrical observations, the position of a great number of points in different parts of the globe, especially among the numerous island groups of the Pacific Ocean, notorious for shipwrecks, and so remarkable for the character and the form of the shoals, sandbanks, and reefs, of which they in part consist; also to trace new routes through the Dangerous Archipelago and the Society Islands, side by side with those taken by Quirós, Wallis, Bougainville, and Cook; to carry on hydrographical surveys in continuation of those made in the voyages of d'Entrecasteaux and of Freycinet in Polynesia, New Holland, and the Molucca Islands…." Second in command was Jules Sébastien César Dumont d'Urville, who would later conduct two monumental Pacific voyages of his own, one reaching Antarctica.

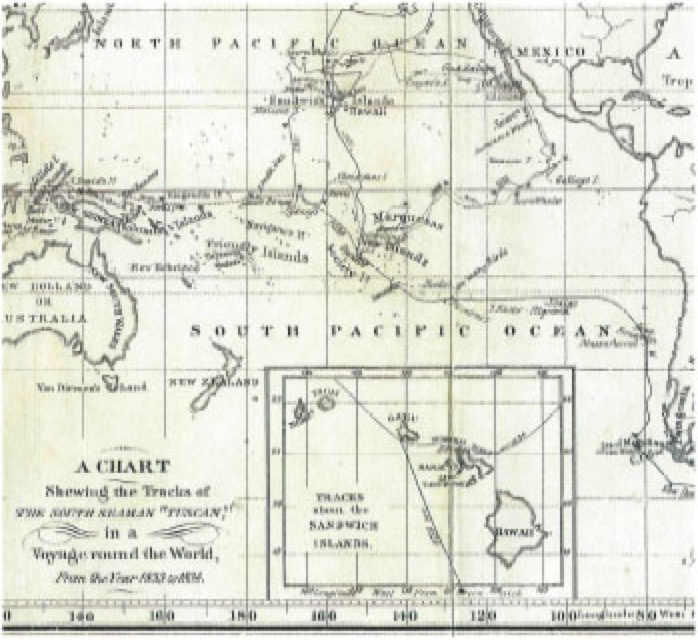

NORTH PACIFIC OCEAN
MEXICO
Marquesas
Friendly Islands
SOUTH PACIFIC OCEAN
NEW ZEALAND
A CHART
Showing the Tracks of
THE SOUTH SEAMAN "TUSCAN,"
in a
Voyage round the World,
TRACKS
about the
SANDWICH
ISLANDS.
HAWAII
140
160
180
160
140
120
100
80

Fig. 207. Detail of the general map from Frederick Bennett, *Narrative of a Whaling Voyage Round the Globe,* 1840. Bennett sailed with the whaler *Tuscan* to study the natural world, and marked some of his observations on this map. His use of a whale motif to denote sightings of the animal was echoed by the US government on Matthew Maury's more comprehensive

whale map (Fig. 219).

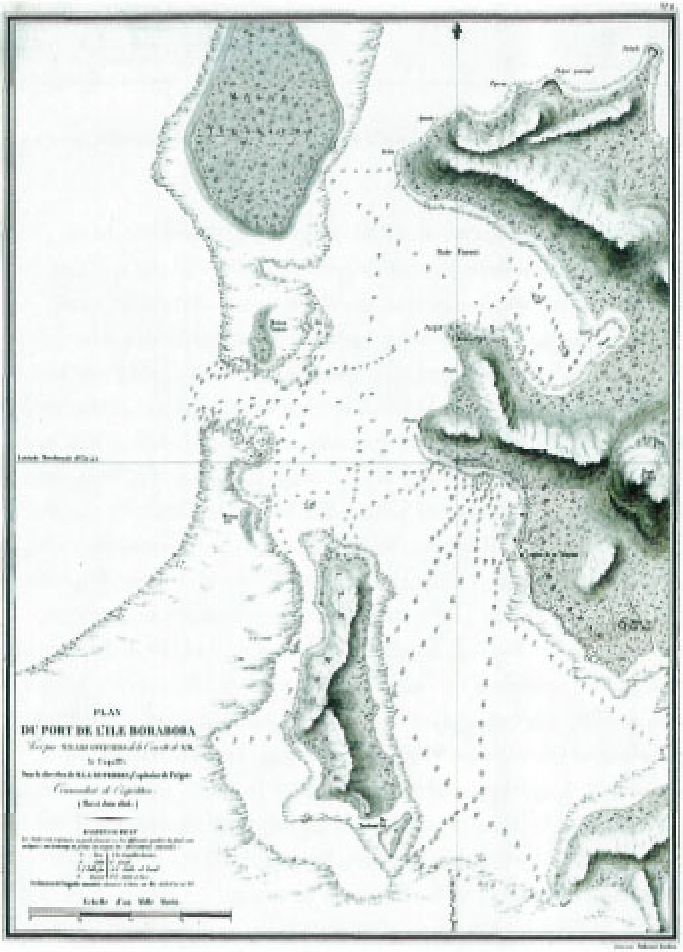


Fig. 208. Western Bora Bora, Duperrey, 1827. Duperrey's chart, with extensive soundings, guided vessels through the reef's one navigable passage, Teavanui Pass. The nature of the sea floor is indicated by key—mud or silt, coral, sand. A mission is marked at the town of Vaitape, an observatory to the north.

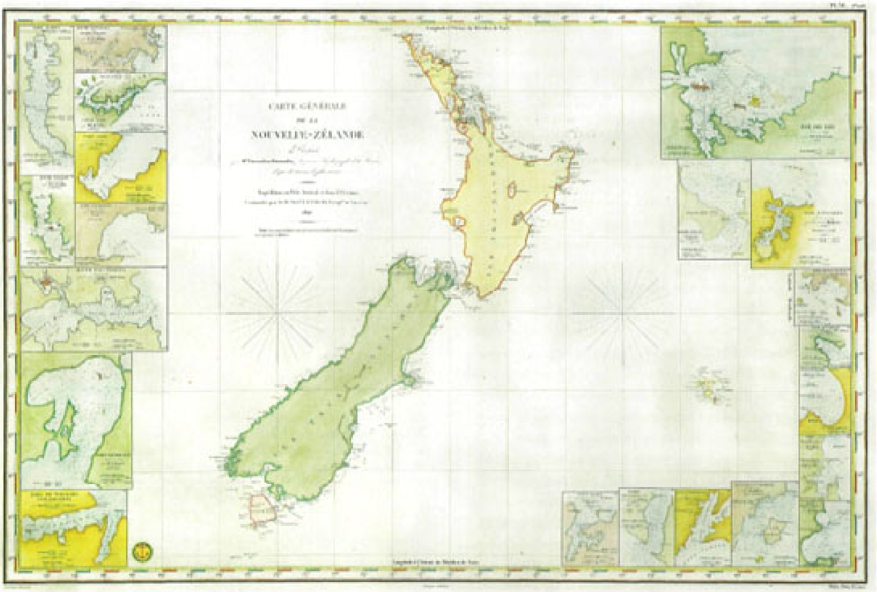


Fig. 209. New Zealand, 1842, compiled by C. A Vincendon-Dumoulin from surveys made on both of Dumont d'Urville's Pacific commands. [Lahaina Prinstsellers, Ltd]

Duperrey left France in 1822, sailed west around South America and followed the continent's coast to near the equator before heading southwest into the open ocean. Extensive work was done on magnetic diurnal variation (the daily variation of the compass). After about a month crossing the Pacific, they reached the Tuamotus and made landfall on one inhabited isle, discovered three uninhabited ones, and then sailed for Tahiti, which had not been visited by a French expedition since Bougainville. Bougainville's idyllic description of Tahiti, and in particular the romanticists who massaged that description to suit their philosophies, had created quite some anticipation among Duperrey's crew But when the sailors arrived in 1823, they found a puritanical society controlled by strict English fundamentalists who had learned to exploit the Tahitian political system. The four-year-old heir to the crown, Pomare III, was being given a strictly English education, and was crowned as the missionaries' puppet at age five. His father, King Pomare II, had converted to Christianity in 1807, ten years after the arrival of Wilson's missionaries on the *Duff,* then a year later been expelled by his own subjects, but regained power in 1809, determined to convert the Tahitians by force.

From Tahiti, Duperrey sailed northwest to Bora Bora (Fig. 208), where the island civilization had also undergone dramatic change. Sailing west from the Societies, Duperrey made better charts of some of theTongan Islands, Ndeni (Santa Cruz), and Buka in the Solomons. They continued to New Ireland and on to the Moluccas, where they crossed south of the Indies and backtracked east through the Torres Strait, and on to Australia. Leaving Sydney with the missionary George Clarke, Duperrey sailed east to New

Zealand, where he spent two weeks in the Bay of Islands in April 1824. From New Zealand they sailed north to Rotuma, where they found four deserters from the whaler *Rochester* well integrated into island life, and then on to the Carolines.

After the expedition's return, second-in-command d'Urville noted that with the basic outline of the Pacific now set and prolonged visits to various islands more practical, the brief stops and hurried passages of the circumnavigations should now give way to more careful large-scale surveys: "The expedition on the *Coquille* in which I have just taken part has amply proved to me that a voyage around the world is capable of rendering real services to geography." But the focus was shifting from the "filling in the blanks" of the eighteenth century to the need for impeccable, large-scale surveys: "The scene of these operations must be limited … the navigator who makes an exact study of some still unknown region of the globe will do something more worthwhile than someone whose ship has plowed through the immense spaces of the sea and only hastily visited some of the islands scattered there." To that end, d'Urville undertook a new expedition, sailing on the same 380-ton corvette that was the *Coquille* of the Duperrey voyage, but renamed *LAstro lake* after La Perouse's vessel, since part of his mission would be to investigate a whaler's report of having sighted the hero's wreck between the Louisiades and New Caledonia.

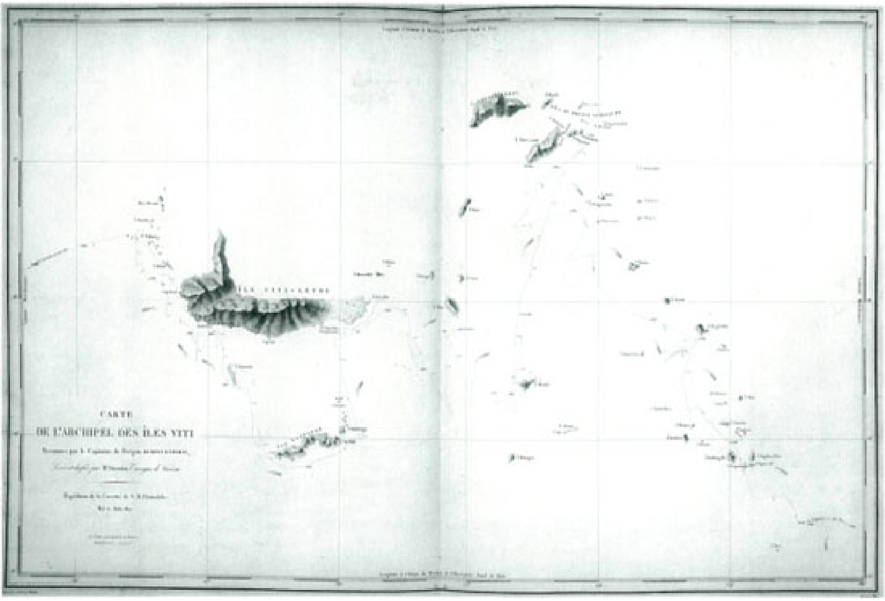


Fig. 210. Fiji, Dumont d'Urville, 1830. Fiji was a daunting challenge to surveyors; here the major islands are still only partially mapped. [Donald A. Heald]

French aspirations of a colony in southwest Australia brought the expedition to its first major stop, King George Sound, where an observatory was set up and charts made of the coast. New South Wales was next, after which they steered for New Zealand, reaching its shores in early 1827. D'Urville and his cartographers worked their way up the west coast of the South Island, then turned toward the Cook Strait, where in the process of making a detailed survey of Tasman Bay, what had been supposed to be its northwestern tip was found to be an island—now named for the commander. Evolutionary improvements on existing charts were made as the crew sailed north; the Hauraki Gulf, where Auckland now sits, was judged a good site for a colony.

From New Zealand, d'Urville sailed for Tongatapu. Although relations between the Tongans and French were outwardly friendly, some Tongans had plotted to take the *Astrolabe,* and d'Urville managed to take leave of the island only after ten days of violence and diplomacy successfully returned several kidnapped sailors.

Next, they attempted the mapping of Fiji—one of the most difficult archipelagos to chart in all of Oceania because it is a complex series of islands strewn with hazards, making passage through it extremely dangerous. D'Urville approached Fiji from the east, into the Koro Sea, which though deep has many potentially disastrous reefs. Realizing that his zeal to map the island had led him into a potentially deadly maze, he had Fijians help navigate the *Astrolabe* out of those dangerous waters, then followed a southerly course. The result of this concession to safety is easily seen in the map in Fig. 210: Viti Levu, the large island to the left of center, has only its southern and western coasts, completely lacking the north and east; the island is in truth a rough oval. Looking to the northeast to the island of Vanua Levu, only fragments of the claws forming Natewa Bay appear, and the southwestern bulk of the island is altogether lacking. Nonetheless, many of the smaller, scattered islands are recorded, including the Yasawa group, discovered by William Bligh along with Viti Levu in a nearly fatal episode en route to the Indies after the mutiny.

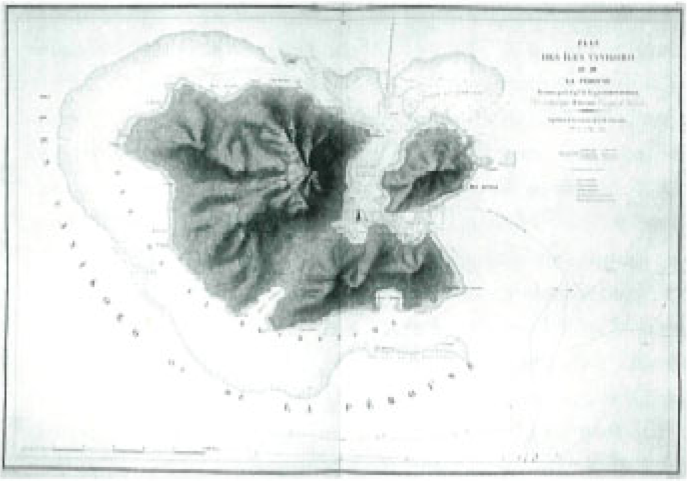


Fig. 211. Vanikoro (Santa Cruz Islands), Dumont d'Urville, 1830. On a stop in Tasmania during his first Pacific expedition, Dumont d'Urville was informed that Peter Dillon had followed evidence of the lost navigator, La Perouse, to the island of Vanikoro, where artefacts from the voyage were found. D'Urville went to investigate, collected more evidence of the wreck, and produced this map, showing the larger island of Banie and its smaller neighbor, Tevai. Vanikoro "offers a striking example of a barrier-reef," Charles Darwin later wrote. "It was first described by the Chevalier Dillon, in his voyage, and was surveyed in the 'Astrolabe'," that is, by d'Urville, this being the map that Darwin consulted. Mendaiia and Quiros were at the northern part of the Santa Cruz group in 1595, and Carteret reached Vanikoro in 1767. The first serious attempt at mapping the archipelago was carried out by d'Entrecasteaux during his search for La Perouse (see Figs. 169–171). But it was probably Jules Verne, in *20,000 Leagues Under The Sea,* from whom most people know of Vanikoro. [Donald A. Heald]

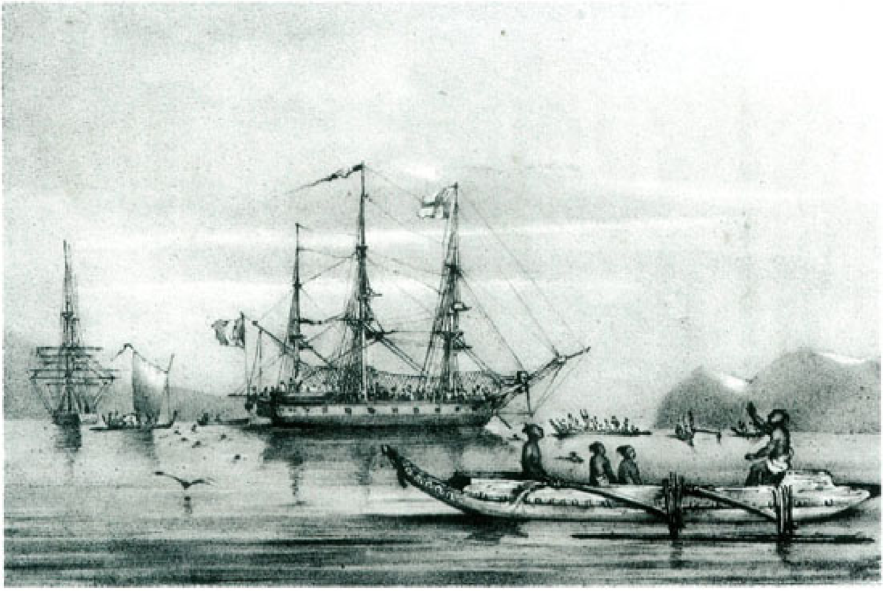


Fig. 212. D'Urville's ships, the *Astrolabe* and *Zelee,* anchored in Taiohae Bay, Nuku Hiva, 1838. Lithograph, ca. 1845.

During his three weeks mapping Fiji, d'Urville consulted with a man from Tonga and one from Guam, from whom he acquired the names of many islands in the archipelago. In addition to the general map above, several larger-scale maps of Fiji were produced.

From Fiji, d'Urville's next mapping stop was the Loyalty Islands, just east of New Caledonia, and then the long chain of reefs extending NNW from New Caledonia to little Huon Island. Next, he set out for the Torres Strait to lay down its difficult passages with precision, this being a specific assignment of his sponsors, but the weather prevented any such attempt. Instead, he traversed the dangerous Louisiades, just southeast of New Guinea, and then charted a large portion of New Guineas northern coast that had remained little known. New Britain was to have been charted as well, but the surveys were impossible because of unceasing rains.

After a reprieve in the Indonesia island of Amboina, d'Urville sailed around Australia to Tasmania, where he learned of Peter Dillon's discovery of the wreck of La Pérouse's ship. This having been a goal of d'Urville himself, he sailed for Vanikoro, where he confirmed the find, collected artefacts, and made a detailed map of the island (Fig. 211). Sickness among his crew deterred him from looking amongst the Solomons for survivors of that ill-fated voyage. Instead, he sailed north to the Caroline Islands, then Guam, and back home to France in March 1829. Forty-five fine new charts were added to the corpus of Pacific cartography as a result of this first voyage under d'Urville's command, though he was criticized for having failed to produce one particularly coveted chart—the Torres Strait.

Eight years later, d'Urville was sent back to the Pacific with two ships, the *Astrolabe* of his previous voyage, and the *Zelée,* under Charles-Hector Jacquinot. Vincendon-Dumoulin was principal hydrographer. After two months fulfilling an assignment to investigate the iceberg-laden seas of Antarctica, which he did as best he could with their inadequately shielded vessels, he sailed for warmer seas in early March 1838, first to Mangareva (Gambier Islands), then on to the Marquesas (Figs. 212 and 213).

Three months were devoted to the mapping of Samoa and refining the previous voyage's mapping of Fiji. The Solomons were surveyed next, followed by a passage through the Carolines and on to Guam, then Palau. Micronesia's balmy seas were left for a second attempt to penetrate the high latitudes to Antarctica, where d'Urville briefly encountered the American Charles Wilkes. After a stop in New Zealand, surveys were conducted of the Loyalty Islands, of the Louisiade Archipelago, and finally, lest he return home to the chastisement of the previous voyage, he made a meticulous survey of the Torres Strait.

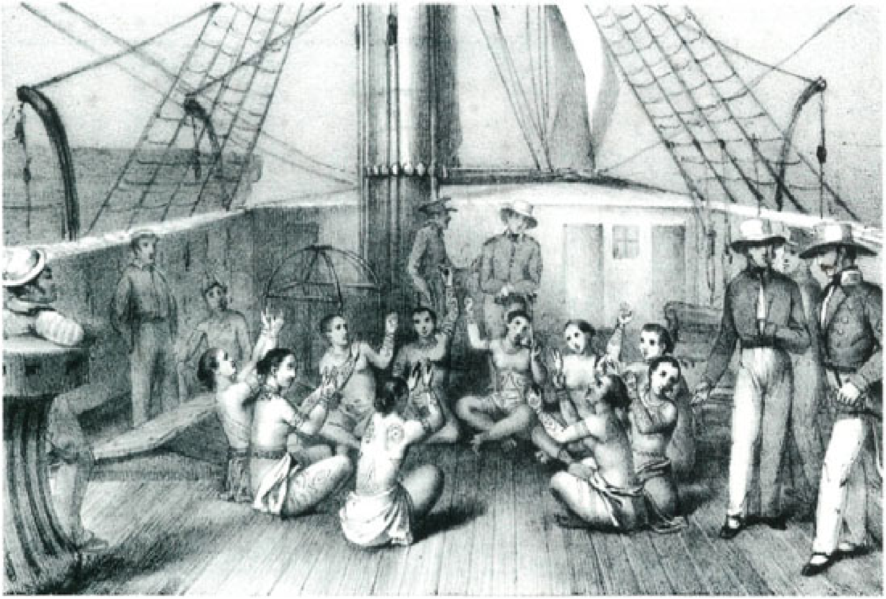


Fig. 213. Marquesans on d'Urville's ship in Taiohae Bay, on the south coast of Nuku Hiva, 1838. Lithograph, ca. 1845.

The project of publishing his charts and journals was cut short by tragedy. Soon after his return to France, d'Urville, the explorer who had gotten the Venus de Milo for France, having survived three monumental Pacific voyages, was killed, along with his wife and son, in one of the world's early train wrecks, outside Paris.

Mapping below the Surface

In 1806, most of the crew of the English private ship of war *Port au Prince* were massacred in Tonga. A survivor, the clerk William Mariner, became an adopted son of King Finau. The account of his four years in Tonga was compiled by J. Martin, supplemented and corroborated by another stranded youth, Jeremiah Higgins.

Accompanying the 1827 account of Mariner's observations, published in Edinburgh for *Constables Miscellany*, was a map of the archipelago (Fig. 215). Martin's text cites the map's addition of the Vava'u group, noting that it was not visited or mapped by Cook. But Vava'u was hardly new to maps at this time, and his map actually places that northern (leftmost) island more accurately in longitude than the earlier known island of Tongatapu. "The situation of the submarine cavern" is marked just southwest of Vava u, this being an early record of the cave now named for Mariner. Mariner learned of the cave when Finau and others dove into the sea and did not come up. They had gone to drink "cava" (kava), another Tongan explained, who told Mariner to follow him into the sea. While Mariner's was one of the more colorful instances of the mapping of subaquatic Pacific features, undersea phenomena were becoming more and more a focus of the hydrographer's *eyes.* One avid student of the new hydrographic charts was the young Charles Darwin, who sailed to the Pacific aboard Captain Robert Fitzroy's *Beagle.* At the end of December 1831, the *Beagle* left Portsmouth with twenty chronometers and six survey boats, among other fine equipment, her crew charged with recording data about tides, winds, and currents, and making astronomical and meteorological observations. Point Venus in Tahiti and the observatory at Parramatta in Port Jackson (Australia), both of whose longitudes had been carefully determined many times, allowed the *Beagles* crew to verify the accuracy of its own chronometers.

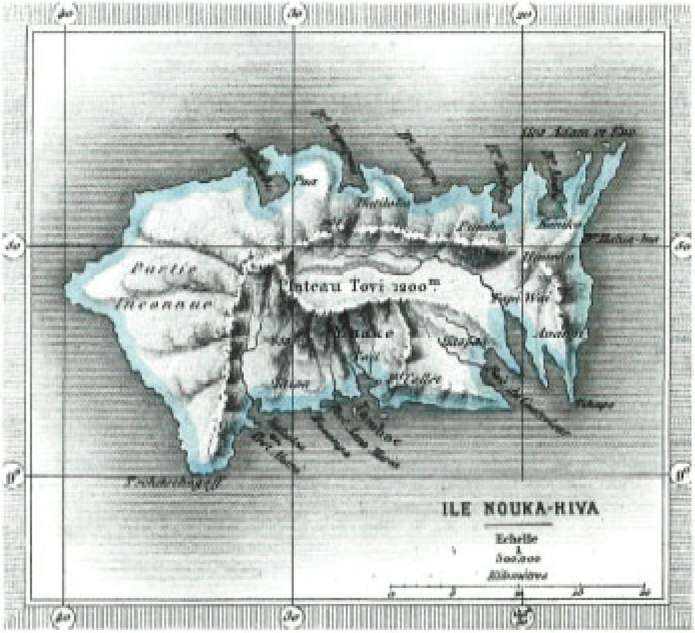
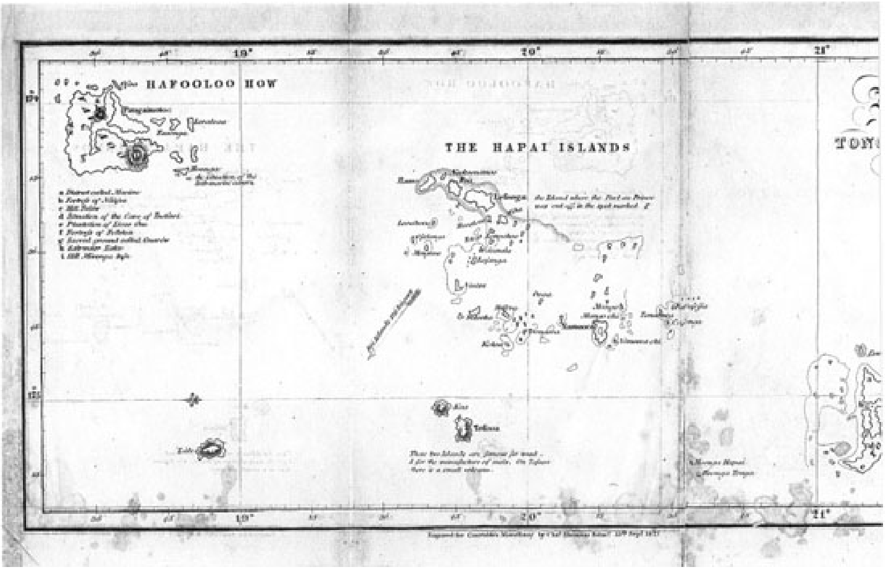
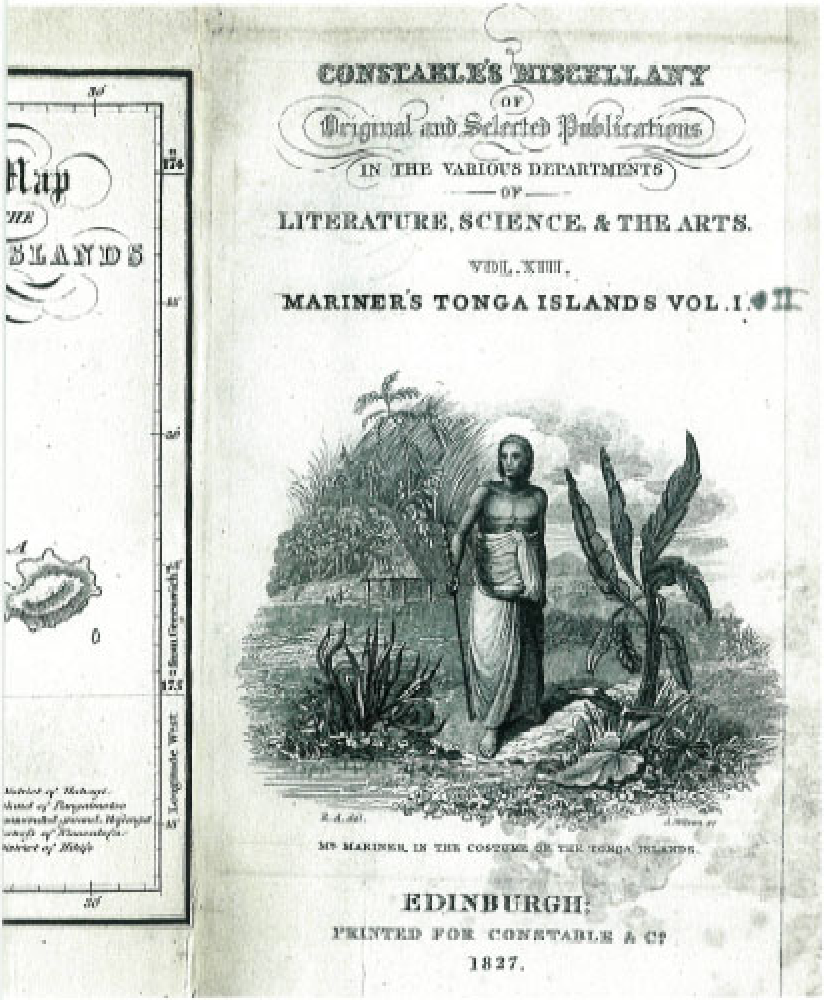


Fig. 214. Nuku Hiva, Abel Pilon, ca. 1885. Despite the importance of Taiohae Bay during the height of Pacific whaling, parts of Nuku Hiva remained, as the map marks in the west, "parts unknown." Published shortly before Robert Louis Stevenson visited the island, and Paul Gauguin settled there, its deline-ation of the west and northwest bears little resemblance to the coast's actual shape. Four decades had already passed since the young Hermann Melville had deserted ship off Nuku Hiva, and then brought the island to the popular imagination with his "Peep at Polynesian Life," *Typee.*


HAFOOLOO HOW
THE HAPAI ISLANDS
TONG
19°
20°
21°
Lefooga
Kao
Tofooa
These two Islands are famous for wood, & for the manufacture of mats. On Tofooa there is a small volcano.



CONSTABLE'S MISCELLANY
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OF
LITERATURE, SCIENCE, & THE ARTS.
VOL. XIII.
MARINER'S TONGA ISLANDS VOL. I. II.

Mr MARINER IN THE COSTUME OF THE TONGA ISLANDS.

EDINBURGH:
PRINTED FOR CONSTABLE & Co
1827.

Longitude West from Greenwich

Fig. 215. The Tongan archipelago, from William Mariner's account of the islands, 1827.

Five weeks were spent making a survey of the Galapagos, the islands with which Darwin is most famously associated. Although the Tuamotus were deliberately skimmed en route to Tahiti, time and resources had not permitted survey work there; Fitzroy nonetheless was able to compile unpublished data about the Tuamotus from a couple of people he met in Tahiti. One, a fellow Englishman named John Middleton, had a chart of the Tuamotos with each island labeled according to its indigenous name. Fitzroy copied this, along with further information gotten from the son of a missionary resident in Tahiti, onto Kotzebue's chart of the Tuamotus (Fig. 203), whose atlas was among his onboard references.

The United States Exploring Expedition

The young United States sponsored an expedition to the Pacific as remarkable as Britain's Cook, France's La Perouse, and Russia's Kotzebue. The purpose of the United States South Seas Exploring Expedition, or US Exploring Expedition as it was commonly known, was eminently practical: to explore and chart the Pacific for the betterment of the nation's commerce. Among its unlikely origins was the goal of reaching Antarctica to pursue a theory being promoted by one John Symmes, that the earth is hollow and that entrances to its interior would be found at either pole. This theory, though not popular then, has not entirely vanished; a polar "hole" is still being entertained as the entrance to fabled Agharta, proponents even using purported NASA images to support their claims. The concept had noble proponents. Ancient in its origins, Edmund Halley is generally credited with giving it scientific respectability, and the American puritan, Cotton Mather, with religious approval.

In 1828, with John Quincy Adams as President, Congress approved the expedition with the understanding that it would not receive special funding. The project then entered a decade-long period of delays and squabbles, and may not have been resuscitated were it not for Edmund Fanning, the captain from Connecticut who rescued the *Duff's* missionary William Crook from his troubles in the Marquesas. Fanning is credited with several modest discoveries in the Pacific, and the 1833 account of his voyage helped fuel interest in the Exploring Expedition project.

A fleet of six ships finally sailed in August 1838 under Charles Wilkes, who before this assignment had been sent to England and the Continent to purchase chronometers and other instruments. Among their onboard library were the atlases from the voyages of Duperrey, d'Urville, and Cook. Like Cook, Wilkes had already proven his mapping expertise in surveys performed in the Atlantic Seaboard of North America.

New England mariners had a great stake in this project. The East India Marine Society of Salem (Massachusetts), nucleus of American commerce in the Pacific, was particularly anxious to have charts of Fiji, putting the matter thus: "The Feejee or Beetee Islands, what is known of them? They were named but not visited by Captain Cook, and consist of sixty or more in number. Where shall we find a chart of this group, pointing out its harbors and dangers? There are none to be found, for none exist! And yet have we no trade there? We speak not for others, but for ourselves." This is not quite true, of course. Charts of Fiji had already been published, but they were inadequate to allow a vessel safe passage through Fijian waters, even if they were available in Salem. Good charts of Fiji would benefit the young nation's economy.

Wilkes's mandate was "for the purpose of exploring and surveying [the Pacific], as well to determine the existence of all doubtful islands and shoals, as to discover and accurately fix the position of those which lie in or near the track of our vessels in that quarter…." Congress made clear that scientific endeavors without direct commercial application, though of interest, were not the mission's primary objective. The impetus for the expedition, rather, was "the important interests of our commerce embarked in the whale-fisheries, and other adventures in the great Southern Ocean…."

A year into the voyage, in August 1839, the expedition reached the Tuamotus and began their triangulation surveys. Wilkes's methods were exacting, his discipline strict to a fault, and of the sixteen Tuamotu islands they charted, three could not be found on any existing chart—Taiaro, Kawehe, and Ahii.

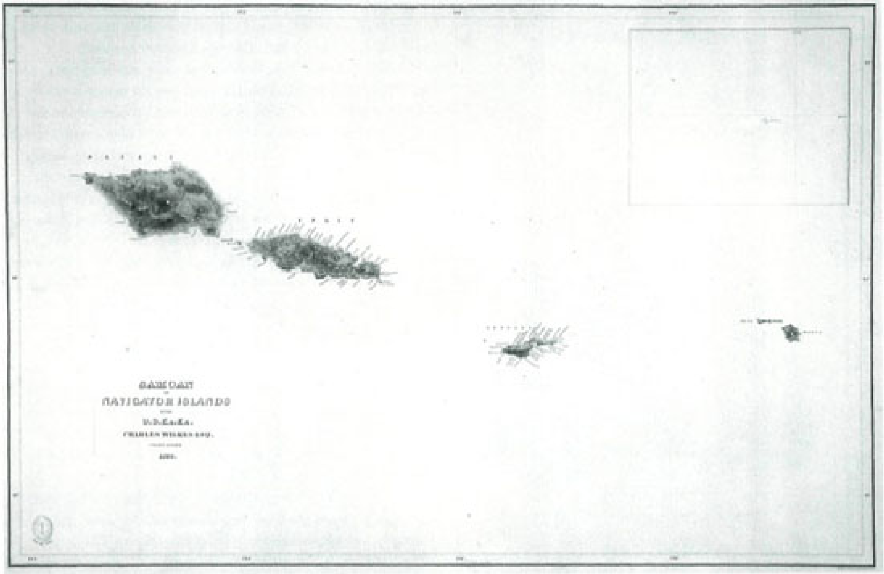
After surveying the Tuamotus, sails were set for Tahiti, which they reached in mid-September 1839. The dramatic change effected in Tahiti by puritanical, fundamentalist missionaries was applauded by Wilkes, who considered his sailors' disappointment an asset to their surveying tasks. Point Venus assumed its usual role as observatory site, and Tahiti's harbors were surveyed.

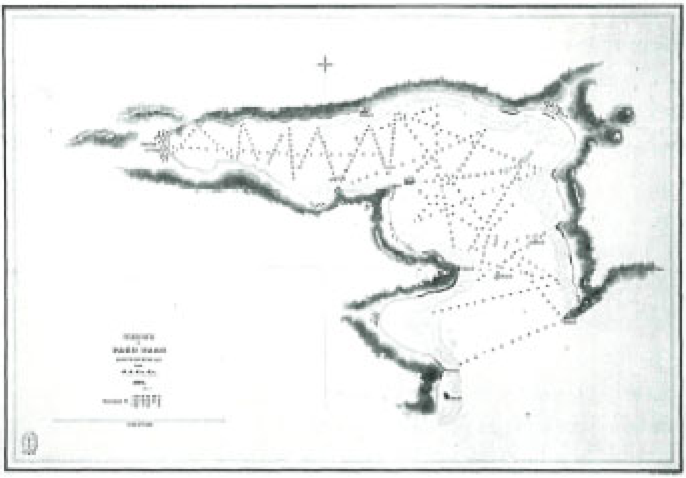
Samoa and Fiji, however, were the expedition's primary mapping goals. Two of the fleet's vessels continued to Samoa and completed a comprehensive survey of that entire island group (Fig. 216), along with separate maps of the individual islands and a chart of the harbor of Pago Pago (Fig. 217).

The expedition then stopped in Australia, where repairs were performed on the ailing vessels before sailing south for Antarctica. In contrast to Cook, who had disproved a southern continent at any "usable" latitude, Wilkes knew that land lay far to the south and attempted to survey parts of its coast. While meandering through the icy fog, they came across the two vessels of the French expedition of d'Urville. Winds prevented the latter from approaching Wilkes's vessel, who misconstrued the snub as deliberate.

Fiji was their next jaunt. Wilkes set up a camp on the island of Ovalau, just 17 kilometers off the east coast of Viti Levu, which he judged to be in an advantageous position from which to measure angles between the many islands and peaks. Enduring trying conditions for the task, the crews of the *Peacock* and *Vincennes* conducted surveys of the entire archipelago (Fig. 218).

In early July 1840, after a couple of months of the Fiji mapping project, surveyors of both vessels met to tally their progress. The allotted time, they realized, had been insufficient to chart the complex archipelago, so the decision had to be made whether to leave it unfinished, to the disappointment of American commerce, or to cut the crew's rations by a third and stay longer than anticipated. Rations were cut, the stay extended, and the charts of Fiji completed—probably the greatest achievement of their projects in Oceania. Although the mapping of Fiji still had much to keep surveyors busy—Natewa Bay, for example, is poorly formed— comparison of the general chart in Fig. 218 to that of the extremely competent d'Urville (Fig. 210) will show the degree of mystery that still surrounded the islands when Wilkes arrived, and the extent to which he improved it.





Above: Fig. 216. General map of Samoa. *Below:* Fig. 217. The harbor of Pago Pago (Tutuila). US Exploring Expedition, ca. 1844. [Library of Congress]

Wilkes's mapping of Fiji cost both Fijian and American lives. Despite his government's instructions to show the "courtesy and kindness toward the natives which is understood and felt by all classes of mankind," Wilkes's impetuous temper escalated relatively minor incidents until two crew were murdered on the small island of Malolo, just west of Viti Levu. Wilkes had all canoes on the island destroyed, villages razed to the ground, many Fijians killed, and others forced to grovel before the American "conquerors." Wilkes's mapping of Samoa was also marred by violence when he ordered the destruction of villages in retaliation for the reported death of a sailor from a whale ship.

Wilkes learned of the presence, in the eastern part of Fiji, of a British ship which had damaged her rudder's pintle on one of the archipelago's infamous hidden hazards. Three pintles were spared from the *Peacock* for the endangered vessel, the *Sulphur,* which was an exploring vessel like Wilkes's ships, under the command of Edward Belcher. Charting these unseen dangers was, in fact, the reason for Belcher's visit to Fiji. The urgency his instructions placed on accurate soundings and the recording of the quality of the sea bottom were as important as the precise mapping of the coastlines themselves. With such common goals, Wilkes and Belcher then met in mid-June 1840, comparing their progress and sharing data.

Hawaii offered a welcome change from their harsh life in Fiji. While Wilkes surveyed and explored Hawaii, he sent two vessels back to Samoa and one back to the Tuamotus, these to do further hydrographic research.

The US Exploring Expedition's return was hardly the jubilant reception afforded Cook, nor its memory as indelible. Lawsuits began over various issues, such as Wilkes's having imposed punishments in excess of that permitted by code. Their charting of the southern continent was held in doubt, deemed a hoax by some. Wilkes found the public apathetic to his accomplishments. He was reprimanded for relatively minor offenses, though never for the violence. Wilkes hid behind the flag. He insisted to a military court that the severity was "incumbent on me for the protection of commerce," and that by accusing him they were slandering the country: "its honor, its glory, the untarnished lustre of its unconquered flag all have been assailed." That his gratuitous violence was even an issue, however, reflects that such behavior was now becoming unacceptable among civilized nations.

VITI GROUP
FEEJEE ISLANDS
U.S. Ex. Ex.

Fig. 218. General map of Fiji composed from the surveys of Charles Wilkes and the United States Exploring Expedition, ca. 1844. [Lahaina Printsellers, Ltd] *Overleaf.* Fig. 219. Thematic map recording data compiled from the reports of American whalers. Matthew Fontaine Maury, 1851. [Library of Congress]

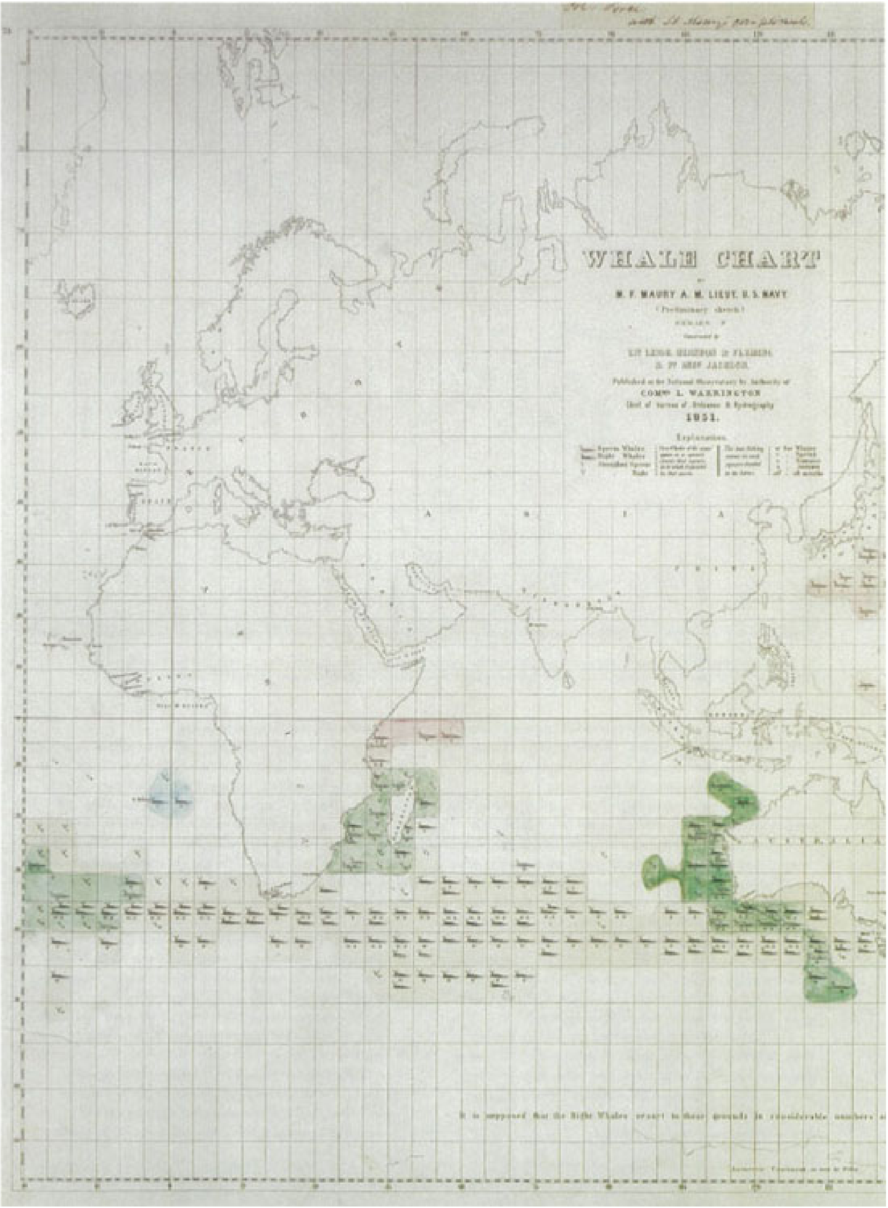
The voluminous surveys brought back by the expedition were carefully prepared and engraved on copper by private firms at government expense, rather than the cheaper lithographic method on equipment owned by the government. Good engraving paper was difficult to find in the United States at this time. The paper was dampened before being impressed with the engraved plate, and common paper tended to dry unevenly, shrinking or stretching more in one direction than another. So uneven was the drying of the paper first used, wrote Wilkes, "that it made all our scales erroneous either in Latitude or Longitude." Like so much of the paper from that period, however, that used by Wilkes, despite his care in choosing it, has not withstood the years well.

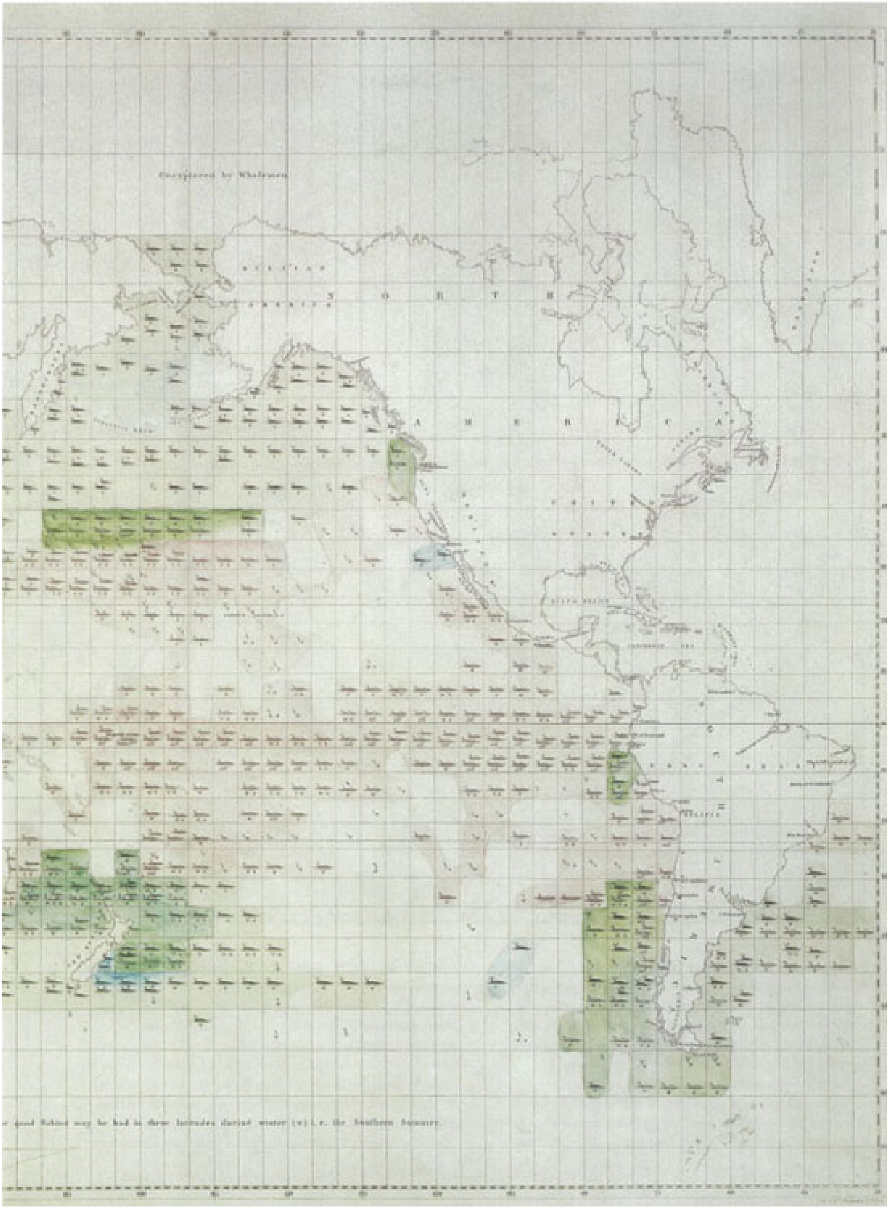
The *Narrative* of the expedition was first published in late 1844. At Wilkes's direction, and in contrast to what had become general convention, specific people were not credited with any particular survey Although it was republished fourteen times through 1858, the editions were relatively small runs, and thus their new maps were poorly distributed.

Thematic and Oceanographic Mapping

Whereas Wilkes's contributions lay in the actual original surveying, the talents of another American, Matthew Fontaine Maury, lay in analyzing and interpreting data brought by such voyages. Maury, chief of the Depot of Charts of the US Navy, believed that the mapping of Oceanographic and meteorological data would make ocean travel safer and faster. During the early 1840s—the peak of whaling activity in the tropical Pacific—he studied the logbooks of navy vessels to track wind data, and in 1848 published his first charts depicting wind currents. Three years later, he published a novel map (Fig. 219), showing the distribution of different species of whales. Each species is identified by an iconic symbol. A whale in outline with a single spout indicates the sperm whale, whereas the block image with double spout is the right whale; a single spout is a straggling sperm, double spout a straggling right.

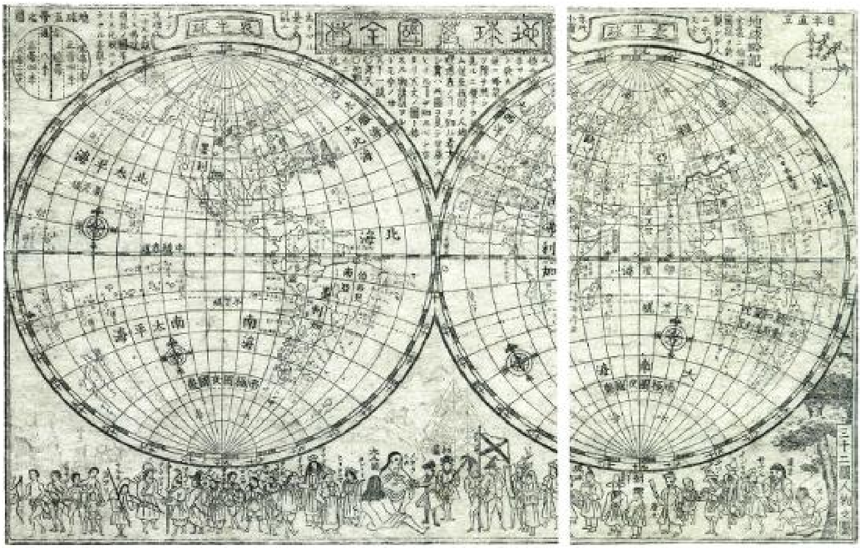
By the mid-nineteenth century, every island of any significance had been discovered and mapped with reasonable accuracy. The sea bottom, however, had not, and to this end in late 1872 the British vessel *Challenger* left Portsmouth for a monumental exploring expedition, visiting various ports in a now largely Westernized Pacific. The beginning of Oceanographic mapping was the *Challengers* principal goal, being designed to pursue "whatever researches might throw light on the physical, chemical, and biological conditions of the deep sea." To such ancient subaquatic concerns as fishing areas and features affecting ship safety were added new demands, such as determining features on the ocean floor that would affect the project of laying a cable between Australia and New Zealand. With this voyage the modern exploration and mapping of the Pacific began.

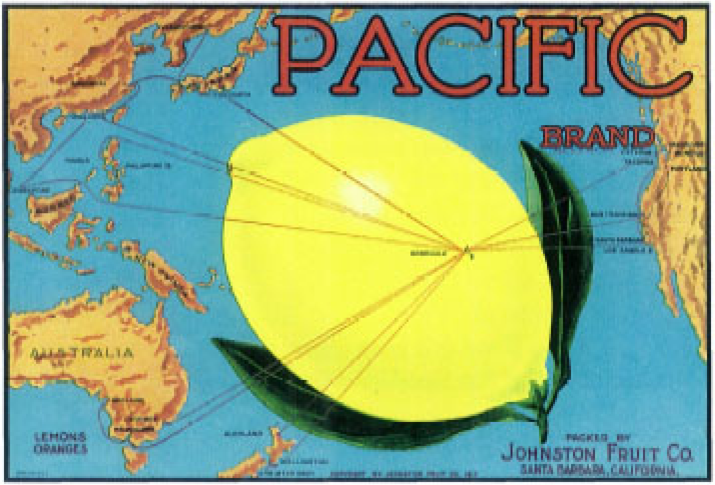

WHALE CHART
M. F. MAURY A. M. LIEUT. U. S. NAVY
(Preliminary sketch)
Published at the National Observatory by Authority of
COMM. L. WARRINGTON
1851.
Explanation
Sperm Whales
Right Whales
AUSTRALIA
It is supposed that the Right Whales resort to these grounds in considerable numbers



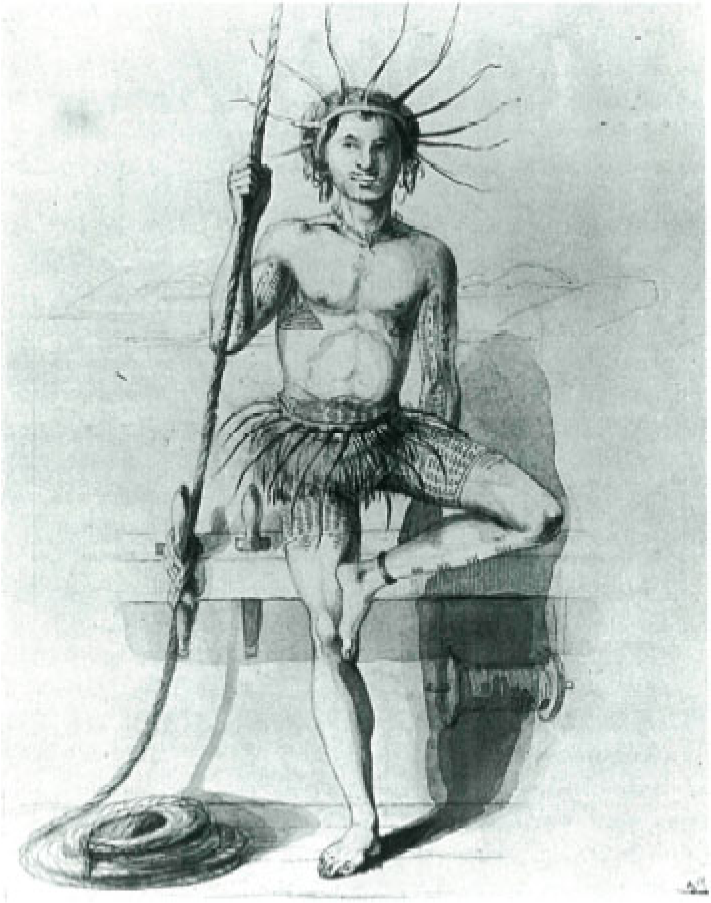
Individually, none of the maps published with the original accounts of early nineteenth-century Pacific voyages were as widely disseminated as those of Cook. In their totality, however, their influence was as revolutionary as that of their forebears from the previous half century. The Pacific had become crowded with islands. That a Kyoto mapmaker produced the world map illustrated above (Fig. 220), shortly after the stream of great Pacific surveying enterprises concluded, is evidence of this; the proper form of southwest Australia and the presence of the Bass Strait, for example, show that he was working from sources no more than a few decades old, yet the simple, almost naive nature of the map does not suggest that he would have sought out the latest data.

Pacific whaling was already in decline before the United States' push to the setting sun gave her viable Pacific ports. Manifest destiny continued over the ocean to Hawaii, which she annexed in 1898, and with the establishing of trading relations with Japan and other far-flung Pacific nations, the Pacific became a vast trade conduit. Hawaii became the pivot for trade between California and western Pacific shores. Thus, when the Johnston Fruit Company, a major lemon distributor during the first third of the twentieth century, designed a label to identify its crates (Fig. 221), it symbolically superimposed a lemon over a map of the ocean, its routes refracting through Honolulu as if the lemon were a lens.




PACIFIC
BRAND
AUSTRALIA
LEMONS
ORANGES
PACKED BY
JOHNSTON FRUIT CO.
SANTA BARBARA, CALIFORNIA

Left: Fig. 220. World Map, Kyoto, ca. 1850. *Above:* Fig. 221. Label to a shipping crate of the Johnston Fruit Co., 1917, boasting trans-Pacific routes. *Below:* Fig. 222. Polynesian man aboard Wilkes's vessel, drawing by Alfred Agate of the US Exploring Expedition, ca. 1840. [Naval Historical Foundation]



Expeditions that explored the Pacific usually collected ethnographic data about the shores they surveyed, such as the above drawing by Alfred Agate, artist on the US Exploring Expedition, of a Polynesian man on Wilkes's vessel (Fig. 222). At first, the maps they drew lost importance as they were replaced by newer ones, while the ethnological records became more significant as they became irreplaceable. With the passing of time, however, the maps that they and those before them created have themselves become part of humankind's historical record, another link in a process that began with shells arranged geographically on a new-found shore.

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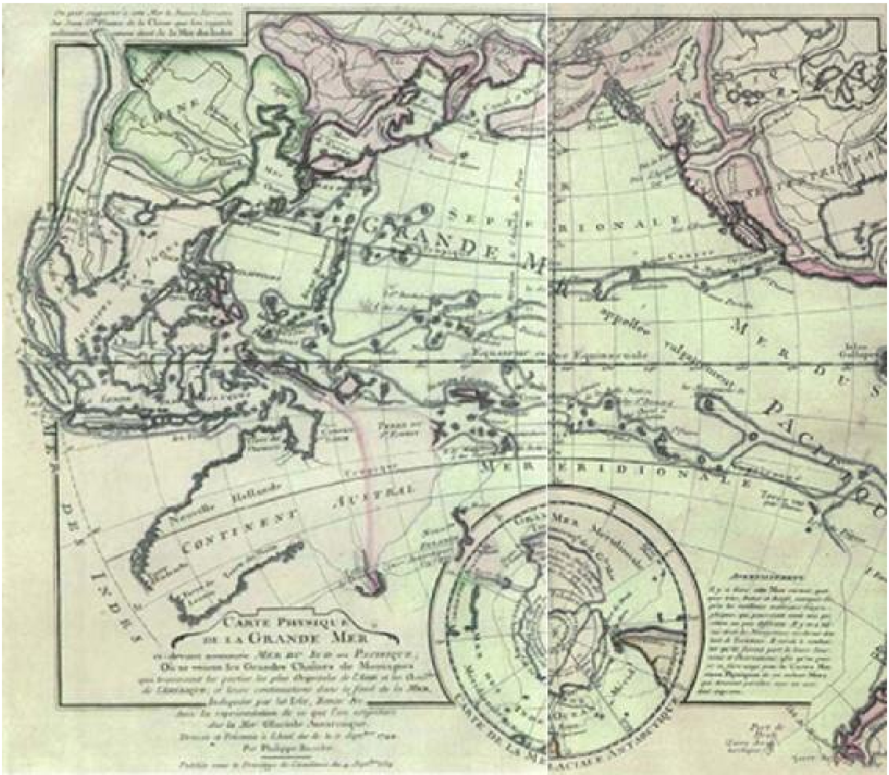
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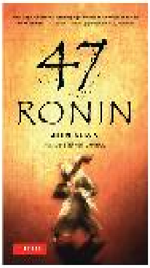

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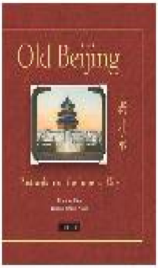
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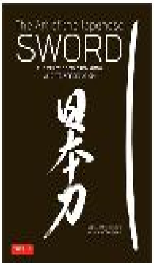
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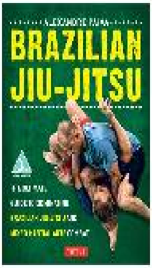
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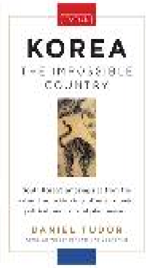
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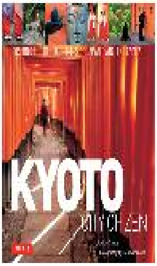

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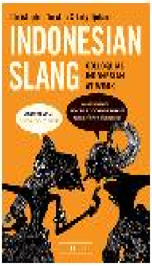
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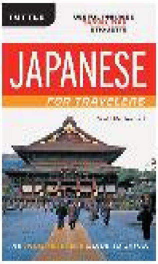
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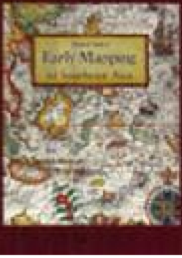

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